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ADMINISTRATION REPORT

OF THE

DIRECTOR OF AGRICULTURE

FOR THE YEAR

1938.

GEORGETOWN, DEMERARA:
PRINTERS TO THE GOVERNMENT OF BRITISH GUIANA.
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1939.

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DEPARTMENT OF AGRICULTURE.

ADMINISTRATION REPORT OF THE DIRECTOR OF AGRICULTURE FOR 1938.

SECTION I.

AGRICULTURE IN THE COLONY.

General.

During the year under review it was necessary to collate a considerable amount of information concerning matters agricultural to put before the members of the Royal Commission, and this enabled a picture to be made of the position to-day which clearly refutes the statements of those who consider that agriculture in the colony has made but little progress since the last century.

2. Viewed at close quarters, the initial difficulties which must be overcome before the coastlands can be brought under cultivation, the struggle and expense of maintaining most soils in a 'crop worthy' condition, and the low agricultural prices which have ruled for many years may well create the impression that little or no agricultural progress is being made in British Guiana. But a long range view of some of the agricultural industries, showing them in their true perspective, does not confirm this.

3. To begin with livestock ; at the beginning of the present century, cattle exports were relatively high, but subsequently they fell considerably. This was due to various reasons, the chief of which were the extension of rice on lands previously available for livestock, the smaller number of pedigree bulls available for service on and near estates, and greater self-sufficiency of Surinam in regard to meat for home consumption. At the present time the annual export stands at over 1,000 head (in the period 1915-25 it only averaged 450 head) and gives every promise of further increase. Cattle exports have periodically risen as high and even higher than the present figure, but at no previous time did the export situation look as encouraging as it does now. This, to no small extent, is due to the inspection system inaugurated by the Department for all animals leaving the Colony, propaganda in connection with the importance of animal production, together with the programme for increasing the number of grade bulls available for service in the districts, and a direct steamer service between Trinidad, Georgetown, New Amsterdam and Springlands. There may, of course, be other factors : there are, for example, rumours of a reduction in numbers available for export from Venezuela.

4. Poultry is another livestock industry which has entered the export market ; the figures for both live birds and eggs indicate remarkable activity. The widespread interest in this industry encourages the belief that the export trade should further expand, especially as there is now in existence an energetic and representative Poultry Association. The extension of rice resulting in cheap and widespread supplies for feeding, free entry of high protein feeds, the increased production by the Department of pedigree stock, the distribution in the districts of eggs and progeny of this stock, the existence of direct steamer connection with Trinidad are all factors which have led directly to the present favourable outlook.

5. In regard to rice, exports since 1933 have been somewhat lower than in 1930-33, but various causes have been responsible for this, including the succession of bad crop years, declining prices overseas and increasing home consumption. However, if the rice situation over an extended period is studied, it is easy to appreciate what has been the trend in development. Thus, the average acreage under cultivation 1906-08 was 27,000 acres ; the average for the last three years is about 60,000 acres. The Department's work on improvement of strains and a search for

new varieties together with marketing efforts need not be stressed here, while milling, considered at present to be the major factor in the future stability of the industry, is likely soon to be improved by centralization. Questions of drainage and irrigation have been repeatedly emphasized and must be taken into consideration in any schemes for further expansion.

6. There has been a decided downward trend in the exports of coconuts and coconut products during the past decade but this reduction is more apparent than real since increased domestic consumption has risen sharply during recent years. In 1928 British Guiana imported 321,112 gallons of edible oil at an estimated cost of $269,756 but in 1938 these imports amounted to only 23,113 gallons valued at $18,280.

7. Recent trials by the Department with the flue-curing of bright leaf tobacco have given a noticeable fillip to the production of this crop for local cigarette manufacture. A survey shows that the number of growers presenting marketable cigarette leaf tobacco is double what it was two years ago.

8. Restriction of sugar has unfortunately put a stop to the increase calculated to result from the financial investments and the field achievements during the last decade. In these circumstances the only course now appears to be to mark time with the production of that crop while pressing for the extension of the rice industry, the development of livestock and the more extended practice of granting allotments to cultivators; by this means labour would be rendered more self-supporting, better able to tide over periods of under-employment caused by restriction in sugar output and on the whole more contented generally.

9. To lack of better drainage is frequently attributed the fact that even more development has not taken place in British Guiana. But from 1924-37 the sums spent by Government on sea defences were more than $2,300,000 while capital and maintenance expenditure on drainage works approximated another $2,300,000. The total figure approaches $5,000,000 and is a large sum for a colony whose revenue from all sources has been under $6,000,000 per annum during the same period. It is evident that the magnitude of the drainage and sea-defence problems on the coastal area is a prime reason why still greater development has not come about. It must be borne in mind that agriculture, in the last analysis, must be made economic, especially in a country such as this in which, apart from sugar, there is little industrial revenue available for re-allocation. Whenever, therefore, development works are being undertaken, conditions made it necessary for thought to be given to the likelihood or otherwise of the expenditure being productive, allowance being made both for capital and maintenance costs. Annually recurring maintenance charges can become, especially in periods of low prices, burdens heavy to be borne.

10. Turning from the colony's exports to the matter of its own requirements, we are reminded that in these days of close competition and trade barriers it is advisable for a small community to be as largely as possible self-supporting and to seek as great a degree of self-sufficiency as it can with regard to imported products which could be produced locally for home consumption, with the output of a little more effort, and modification of existing methods that may at present be too primitive.

11. Taking self-sufficiency in its broadest sense, the situation in this colony compares favourably with that of its neighbours, although there is still room for improvement. As regards the staple foods of the East Indian and African sections of the population, namely rice and ground provisions, these are grown in quantity by the people themselves. The people of the colony, by long custom, prefer wheat flour, and its price brings it within the reach of all, hence the need for other flours is not felt, though the output of maize meal and cassava flour could be largely increased were this necessary. As regards cooking fats and similar items, in recent

years, a promising local manufacture of coconut oil and its by-products has arisen and given the necessary protection could, with animal products, easily cater to the full requirements of the local market.

12. Turning to other food crops, every effort has been made to encourage an increase in the quantities of vegetables, and more especially of peas and beans, produced locally, and many new varieties have been tried by the Department. The uncertainty of the seasons, however, and the lack of water, in many instances, on the sand reef areas where crops of this nature are best cultivated, are all limiting factors, added to which the labour necessary for harvesting and later splitting pea crops in large quantities is not always available. A notable increase has in fact been achieved in the quantities of black eye peas cultivated in the colony. As regards fruit, the colony could be self-supporting, though a certain amount of importation takes place when the fruit of neighbouring colonies is ripe during our off season.

13. In the matter of livestock, supplies of fresh meat are readily available, but there is much still to be learnt with regard to preserving and pickling meat, though attempts to do this locally seem recently to be meeting with somewhat more success than in the past. The principal fault now appears to lie with the meat itself, since under local conditions the carcases do now show that degree of fat which is essential for the quality and flavour required.

14. Conditions are, it should be stated, better suited to the economic development of beef and beef products than to good dairy herds, and in a country where distribution of fresh produce is difficult, such items as tinned milk must figure largely amongst the imports. Despite this, the introduction of new agistment areas and the extension of breeding units in Berbice and Essequibo are both further steps towards the general improvement of cattle in the colony and the establishment of a good type of dual purpose animal. In the last analysis, however, much will depend on feed, since animal nutrition in this colony is seriously deficient. Organised marketing is the ultimate aim.

15. In order that the people themselves shall help to play their part in bettering the home production of agricultural produce and lowering the quantity of imports, every effort has been made to introduce an agricultural bias into the education of the children, and the school teachers of elementary schools who received a special course of training from the Department with this end in view have already met with marked success in their districts.

16. In regard to future development, hope has been raised by the much discussed proposals of settling Jews in the colony. This, however, is not as much an economic undertaking as a desperate effort to settle persons who have been driven from their homes. Under normal conditions the economic considerations referred to above must, of necessity, have been given their due weight before any project for settlement and development of the interior could have been financed. The conditions are, however, definitely abnormal and there may be forthcoming, as a result of the Jewish settlement, development that the colony would otherwise have been unable to afford. In the long run, such development, if proceeded with, would undoubtedly stimulate internal markets.

17. During recent times, drastic changes in our economic structure as affecting the land are being urged in many directions. It seems desirable to emphasize that where changes are contemplated we should be careful not to place expedients before fundamentals. In the words of Stapledon "the affairs of agriculture, slowly moving as they necessarily must be, are ill adapted to respond to the dictates of any immediate expediency, for expediency is ever shifting, and at the best is the mere shadow of what is right and true."

Weather Conditions.

18. Details of the meteorological data obtained during the year are to be found in the annual Meteorological Report of the Department. Owing to the non-occurrence of the Spring dry season the year was an unduly wet one. At the end of August there had been 102.19 inches at the Botanic Gardens, only just short of the highest recorded total for the first eight months of the year. After this long period of continual wet weather, however, the rain stopped abruptly, and in Georgetown, except for one very wet day towards the end of November, there was no more rain to speak of till mid December, when the Christmas rains began, bringing the total rainfall at the Gardens for the year to 119 inches. The continual wet weather for the greater part of the year was most detrimental to all forms of agriculture, the consequent flooding of the coastal savannah areas seriously affecting both rice and cattle farmers. The dry weather towards the end of the year, however, was favourable for the Autumn rice crop.

19. Table I. shows the mean rainfall for 1938 in the coastal area of the three counties, compared with the average rainfall for the period 1929-1938 inclusive.

TABLE I.

MEAN RAINFALL AT COASTAL STATIONS.

Months.	Berbice.		Demerara.		Essequibo.	
	1938. Inches.	1928-1938. Inches.	1938. Inches.	1928-1938. Inches.	1938. Inches.	1928-1938. Inches.
January	13.68	7.39	14.00	9.92	14.14	9.89
February	16.75	5.54	15.28	5.14	9.12	4.42
March	13.59	6.04	16.55	5.49	15.73	4.87
April	15.18	8.09	9.85	7.43	11.79	6.55
May	13.48	11.40	12.28	11.58	14.04	12.23
June	9.21	12.33	11.98	13.88	15.85	13.63
July	7.88	10.88	13.26	11.84	11.80	12.25
August	12.74	6.56	12.23	7.29	7.36	6.76
September	1.41	2.39	2.54	2.75	4.14	3.76
October	2.00	3.66	4.32	3.88	4.87	4.72
November	2.46	3.34	3.77	4.54	6.41	6.04
December	6.34	8.76	8.52	10.99	11.87	11.74
Total	114.27	86.38	124.58	94.73	127.12	96.86

AGRICULTURAL INDUSTRIES.

Sugar.

20. The annual export statistics covering the sugar industry for the ten year period ending 1938 are shown in Table III, while Table II records the acreage reaped, sugar production, yield per acre and rum produced for the period 1932-1938.

TABLE II.

CANE ACREAGES REAPED, PRODUCTION OF SUGAR, YIELD PER ACRE, AND RUM PRODUCED IN BRITISH GUIANA FROM 1932-1938.

Year.	Area Reaped (inclusive of farmers' canes)— English Acres.			Sugar Produced (inclusive of farmers' canes) — tons.			Yield per acre — tons.			Rum Produced—Proof Gallons.		
	Berbice.	Demerara.	Total: Colony.	Berbice.	Demerara.	Total: Colony.	Berbice.	Demerara.	Total: Colony.	Berbice.	Demerara.	Total: Colony.
1932	20,578	33,641	55,240	62,856	83,667	148,634	3.05	2.49	2.69	221,639	558,667	811,650
1933	21,241	33,711	55,811	60,540	80,116	141,956	2.85	2.38	2.54	385,495	821,465	1,239,355
1934	21,663	31,930	53,966	60,675	71,172	132,240	2.80	2.23	2.45	413,773	913,252	1,346,307
1935	22,769	36,637	59,932	75,963	101,273	178,041	3.34	2.79	2.97	669,671	1,073,537	1,775,382
1936	23,702	39,311	63,385	78.831	116,815	195,944	3.33	2.97	3.09	666,280	1,147,301	1,819,581
1937	24,597	40,293	64,890	77,012	109,863	186,875	3.13	2 73	2.88	743,860	1,144,471	1,888,331
1938	23,642	39,299	62,941	76,014	120,488	196,502	3.21	3.06	3.12	512,266	1,196,198	1,708,464

Table III.

EXPORTS OF SUGAR, RUM, MOLASSES AND MOLASCUIT — 1929-1938.

Year.	Sugar.			Rum.		Molasses.		Molascuit.	
	Tons.	Value in $	Value per ton in $	Proof Gallons.	Value in $	Gallons.	Value in $	Tons.	Value in $
1929	100,449	5,943,788	59.1	1,109,482	491,476	2,536,623	141,203	1,803	27,209
1930	114,542	5,418,884	47.3	846,319	362,970	3,851,337	198,454	400	5,768
1931	119,346	5,325,755	44.6	722,076	339,644	7,106,997	369,338	66	945
1932	137,078	6,442,515	47.0	645,511	286,760	7,554,520	387,794	205	2,952
1933	127,083	5,745,151	44.9	883,019	383,262	8,137,233	421,706	178	2,796
1934	129,913	5,568,454	42.8	1,120,090	486,425	5,384,834	278,354	...	...
1935	174,156	6,926,439	39.7	1,073,405	422,660	5,949,393	307,931	205	3,444
1936	176,505	6,853,058	38.8	1,444,877	636,351	8,168,250	419,712	382	6,426
1937	181,574	7,608,105	41.9	1,218,598	543,241	5,776,864	297,226	459	7,706
1938	183,478	7,573,905	41.2	1,069,225	474,453	5,892,004	302,091	482	8,106

21. The average f.o.b. price received for 96° sugar during the year as supplied to the Customs Department by the sugar exporters was $41.2 per ton. Much disappointment had been felt in the Colony as a whole, and in sugar producing circles particularly, at the continued low prices. There was some encouragement, however, from the fact that prices in the closing months of the year were higher than they had been for eleven months and it appeared likely that further advances in price were probable. The mobilization of troops in Europe during September reduced the supply of farm labour available, and it seemed probable that the beet crop would be a short one. For these and other reasons it was, with some relief, anticipated that the prices for 1939 would be an improvement on those for the year under review.

22. The sugar industry is passing through a very troublous period, brought about not only by low prices but by labour unrest which has raised its head throughout the Caribbean zone. In spite of these disturbing tendencies it can be said that the industry is probably in a better position to face the future than at any time in the last decade. This has been brought about by the energy and keenness of the planters to profit from the results of the research work undertaken on behalf of the industry. Thus, the variety situation no longer gives rise to anxiety, problems connected with soil management and pest control are being gradually overcome and there is generally a feeling of soundness and solidarity almost entirely lacking 10 years ago. A glance at the yields obtained in recent years will tell at once how the industry has been able to survive. It is true the labour uncertainty still remains but it is not beyond the ability of those connected with the industry—both capital and labour—to solve, given good will and good sense on both sides.

23. The sugar crop for 1938 amounted to 196,502 tons, a small increase on the record output of 195,944 tons in 1936. Of the 69,087 acres under cane, 62,941 acres were reaped during the year, 60,944 on the sugar estates and 1,997 from farmers' canes. The general average yield of sugar per English acre was 3·12 tons, and on sugar estates (including the less efficient) was 3·17 tons.

24. Statistics have been supplied by the sugar estates of the areas under various cane varieties for the 1939 harvest. D.625 is fast disappearing, while P.O.J. 2878 has shown a marked rise. The area under Diamond 10 has remained almost stationary, only a very slight increase having been recorded.

25. Table IV shows the areas under these three varieties from 1933-1939.

TABLE IV.

AREAS UNDER D. 625, DIAMOND 10 AND P.O.J. 2878.

Year.	Variety.		
	D. 625 acres.	Diamond 10. acres.	P.O.J. 2878. acres.
1933	32,964	5,563	...
1934	32,703	8,796	746
1935	32,429	13,303	2,763
1936	28,552	18,850	6,214
1937	21,380	23,700	12,427
1938	13,141	26,356	20,229
1939	4,938	26,865	28,232

26. *Cane Farming.*—This industry is of considerable importance to the villagers on the East Coast of Demerara. As a result of continued pressure farmers are making larger plantings of P.O.J. 2878 and Diamond 10. If yields are to be maintained some assistance with flood fallowing will be necessary, providing farmers are willing to co-operate. It is unfortunate that sugar restriction has prevented further expansion of cane-farming, as it is the main cash crop suitable to West Indian farmers and a large area like the Canals Polder would lend itself to cane-farming, more especially as the drainage of the area is undergoing substantial improvement. Close contact with cane-farmers is maintained by the Department and a register is kept of individual acreages in co-operation with the sugar estates responsible for taking the farmers' crops. The output of sugar from farmers' canes during the past eight years is given below :—

1930	...	...	1,625 tons.
1931	...	...	1,631 ,,
1932	...	...	2,047 ,,
1933	...	...	2,328 ,,
1934	...	...	2,122 ,,
1935	...	...	3,344 ,,
1936	...	...	4,115 ,,
1937	...	...	4,112 ,,
1938	...	...	4,243 ,,

Rice.

27. The area occupied by rice during 1938 was 49,159 acres but, including the spring crop, the area actually reaped was 62,033. The yield was returned at at 70,275 tons padi, which is equivalent to 42,165 tons rice. Table V gives particulars of rice acreages, production and exports from 1928–1938.

TABLE V.

RICE ACREAGES, PRODUCTION AND EXPORTS, 1929–1938.

Year.	Area Reaped (Spring and Autumn Crops) English Acres.					Yields.		Exports.		
	Berbice.	Demerara.	Essequibo.		British Guiana total acreage (reaped).	Padi tons.	Rice tons (60% yield of cleaned Rice from Padi)	Rice.		
			Mainland	Islands				Tons.	Total Value in dollars.	Value per ton in dollars.
1929 ...	28,121	20,962	11,023	6,636	66,742	72,096	43,257	14,091	876,407	62·1
1930 ...	26,689	18,399	10,786	7,608	63,482	64,252	38,551	22,480	1,090,385	48·5
1931 ...	29,217	34,955	10,445	8,875	83,492	78,424	47,054	23,632	1,060,339	44·8
1932 ...	29,218	37,275	12,556	8,892	87,941	84,783	50,869	28,541	1,187,871	41·2
1933 ...	27,120	37,696	13,197	9,112	87,125	63,524	38,154	29,120	1,062,470	36·4
1934 ...	24,990	31,213	6,638	8,110	70,951	55,112	33,067	14,700	583,090	39·6
1935 ...	32,971	32,713	10,054	7,828	83,566	85,522	51,313	10,565	473,086	44·7
1936 ...	23,125	21,086	10,564	8,081	62,856	60,580	36,348	20,559	810,318	39·4
1937 ...	28,189	24,023	8,866	9,709	70,787	73,769	44,261	18,795	783,538	41·7
1938 ...	21,994	19,654	9,562	10,823	62,033	70,275	42,165	12,888	577,155	44·7

It will be appreciated that these figures are approximations, it being extremely difficult to secure accurate figures for a crop cultivated under such varying conditions and subject to so many risks of one kind or another. There was a drop in acreage due principally to bad weather conditions.

28. Despite the increased crops reaped in 1937 exports fell during 1938 from 18,795 tons valued at $783,538 to 12,888 tons valued at $577,155. The abnormal weather conditions prevailing throughout the greater part of the year were largely responsible for this drop in exports. Milling operations were severely hampered and a shortage of immediate supplies resulted in a considerable increase in local values; many exporters were compelled to cancel sales which they had already made and Caribbean buyers were forced to secure their requirements from the East. There seems good reason to believe that local consumption has increased still further and that it is now approximately 28,000 tons per annum.

29. Following a debate in the Legislative Council arising out of the report of the Committee appointed to investigate conditions in the rice industry, a resolution was passed suspending the powers of the Rice Marketing Board and price fixing was abolished as from July 15. The cut-throat competition which ensued was quickly realised to be disastrous, and on November 16 a resolution for the resumption of control was put before the Legislative Council and passed and price fixing was again introduced as from November 22.

30. With the restriction on the output of sugar, an increase in the output of rice is all the more to be desired. Rice as a crop cannot pay for the initial empoldering of land, but is ideally suited to abandoned or thrown out sugar-cane land where the necessary water control is available. As regards soil, climate, combination with sugar as a crop, availability of labour and storage and transport facilities, each one of these factors is in favour of increased rice production. In addition rice in the field suffers from no major disease or pest, though there is a certain amount of loss from insect damage due to faulty storage conditions.

31. Rice is, however, at present severely affected by the prevailing market prices and lack of assured supplies, the success or failure of much of the cultivation depending entirely upon prevailing weather conditions. The present milling system is also a great handicap, on account of the large number of mills conforming to no definite standards and the inefficiency of most of them. In the Caribbean area, the main export outlet, and where it should be possible to extend the market considerably, British Guiana rice is affected by competition with Burma rice, and it is to be regretted that the Ottawa Agreement did not give any preference to the former in this area. Trinidad, our most promising market, at present books large shipments ahead from Burma and this colony cannot always guarantee supplies in the same manner.

32. In some places, particularly the Essequibo Coast, two crops have been grown annually, but on the creek and river banks where the crop is entirely dependent on rainfall distribution, double cropping is seldom possible, and the padi growers have to seek casual employment either on sugar estates or even as woodcutters. The average yield of padi per acre is generally higher than that of eastern countries, but inefficient milling by numerous small units, and a marketing system in which too many middlemen and vested interests participate, have been a great handicap to the prosperity of the padi grower. Thus, the rice industry is passing through a difficult phase, similar to that experienced twenty years ago by the sugar industry.

33. On April 8, 1938, His Excellency the Governor appointed the "Essequibo Coast Rice Committee," with the Honourable, the Colonial Secretary as Chairman, with the following terms of reference —

> To enquire into and advise on the following matters with respect to the proposal to establish a central rice mill on the Essequibo Coast for the purpose of affording relief in that area.

I. The feasibility of establishing at Anna Regina or some other central position a central rice mill operated on non-profit principles, *i.e.*, that after payment of expenses and overhead charges including interest and depreciation the full residual value of the rice marketed should be paid over to the grower.

II. If the establishment of such a mill is considered feasible, the type and capacity of mill recommended, and the cost of its establishment and operation.

III. The best organisation for the operation and management of the mill.

IV. The desirability of providing facilities to enable advances to be made to the growers, either by the mill itself or by some separate organisation to be established for that specific purpose.

V. The arrangements to be adopted with respect to the present indebtedness of growers to existing mills and land owners.

VI. The estimated amount of capital which will be required for the purposes stated at IV and V.

VII. The question of granting compensation to existing millers in the area covered by the operations of the proposed mill and if such compensation is to be granted the principles to be adopted in assessing it.

VIII. Any other matters arising out of the proposed establishment of a central mill.

34. This Committee's report has been submitted and published as Sessional Paper No. 4/1939. Its main recommendation is the establishment of a Central Rice Mill on the Essequibo Coast. The chief advantages which, it is stated by the Committee will accrue are :—

> " Under the scheme the land owner would be placed in a satisfactory position. If he is also a mill-owner he would obtain compensation for the closing of his mill and may, if he wishes, sell or transfer his compensation debentures to his creditors against outstanding debts. Adequate facilities would be afforded to him through the " crop advances " obtainable from the central mill for financing the growing of padi on his land either by himself or by his tenants to the extent that he is prepared to contract with the mill for the delivery of padi. If he makes advances to his tenants he can secure control of their crops ; but he must pay the mill's fixed price less the prescribed deduction for expenses. In short, he would act as a ' middleman ' within strictly defined limits between the grower and the milling and marketing organisation.
>
> The position of the tenant grower of padi would be considerably improved. He would obtain a fixed price for padi of which he would be made aware before planting begins. He would also share in the trading profits of the Corporation through the proportion of such profits which is to be devoted annually to increasing the normal price of padi which is to be fixed for the next ensuing crop year.
>
> The Corporation would be in a position to carry on its export business to advantage because of its ability to contract for future deliveries. It would be assisted in this respect by reason of the fact that land-owners must contract to supply a specific quantity of padi in order to obtain crop advances. It would also eventually be in a position to control the price of rice for domestic consumption subject to any maximum which the Government might fix. The local price of rice is at present governed by the export price and consumers obtain the benefit of any low prices which may result from special conditions obtaining in the West Indian markets. It has been strongly urged by various interests in the Colony that the local price should be fixed at such a figure as would ensure an adequate return to the grower. There is much to support this view and if it is accepted it would be possible to give it effect under the scheme. A slight increase in the local price by ½ cent per lb. would yield almost $270,000 per annum."

35. As a result of a request made by His Excellency and on an intimation from the Secretary of State that some assistance might possibly be obtained from the Colonial Development Fund, especially in connection with the proposal for the erection of a central mill, the Secretary of State eventually arranged for the services of Mr. H. Parker, General Manager of the Government Rice Mill, Perak, Federated Malay States, to be made available to visit British Guiana. A grant was secured from the Colonial Development Fund to cover the cost of his visit. Mr. Parker arrived in British Guiana on September 19, 1938, and left the colony on October 23, 1938.

36. Mr. Parker in his report states that, generally speaking, rice cultivation throughout the colony is carefully carried on. Further, that the padi in British Guiana is, from a milling point of view, of excellent quality, but treatment in the numerous small mills leaves much to be desired. He found grain well up to the standard of Burma and Siam, and far superior to that of Malaya. The yield of padi he regarded as remarkably high, comparing favourably with Japan, and being far in excess of yield per acre in Burma and Malaya.

37. The Department has repeatedly stressed the primitive methods whereby padi is handled and processed at the mills. It is hoped, as a result of Mr. Parker's visit and recommendations, based on wide experience, that a substantial step forward will be made in this phase of the rice industry. While the colony offers scope for the rice industry it is doubtful whether production could ever go forward on stabilised lines unless and until the milling situation is rectified. From this will evolve greater uniformity and more orderly marketing of the finished product and the natural corrollary, namely, systematized methods of dealing with padi cultivators and ensuring to them more dependable prices.

38. Table VI. gives particulars of rice exported during 1938 according to grade.

TABLE VI.

RICE GRADED FOR 1938.

Months.	W. G. Super. Bags.	Super. Bags.	No. 1 Extra. Bags.	No. 1. Bags.	No. 2. Bags.	No. 3. Bags.	White Rice.		Super Broken. Bags.	Broken. Bags.	Total. Bags.
							A. Bags.	B. Bags.			
January ...	2	2,308	906	2,594	7,800	6,021	71	20	167	80	19,909
February ...	...	1,987	346	2,155	7,150	4,730	17	17	278	225	16,905
March ...	...	1,636	1,306	2,173	5,256	4,252	19	6	230	95	14,973
April ...	...	2,746	933	2,474	6,301	5,840	13	8	231	160	18,706
May ...	...	1,583	955	408	2,355	7,273	...	19	313	134	13,040
June ...	...	1,002	912	288	2,552	3,411	2	1	134	50	8,352
July ...	...	1,134	1,339	749	2,831	6,875	3	14	52	100	13,097
August ...	...	2,445	1,029	2,659	1,822	5,444	...	7	10	41	13,457
September ...	...	1,104	910	2,374	1,623	3,610	...	20	6	11	9,658
October ...	...	4,007	1,013	2,153	3,486	4,015	15	6	23	...	14,718
November ...	...	2,653	360	2,035	4,235	3,261	14	16	25	118	12,717
December ...	...	1,935	1,088	2,838	4,457	2,741	...	26	98	22	13,205
Total ...	2	24,540	11,097	22,900	49,868	57,473	154	160	1,567	1,036	168,797*

* Equivalent to 12,888 tons.

Coconuts and Copra.

39. The area under coconuts in 1938 was 22,450 acres. The output of this crop, with its various products, could not be extended to any very marked degree at present. The only really satisfactory site for coconut cultivation in the colony is on the sand reefs, and the greater part of these in empoldered areas is already taken up by coconuts. Only a very great increase in the price of coconut products would make it worth while for planters to grow the crop on the less suitable clay soils, where a great deal of attention to drainage and cultivation is necessary if reasonable returns are to be obtained. It is possible to grow the crop on pegasse, but it is usually short lived under such conditions. The coconut areas are frequently part of a padi landlord's estate, and attempts to extend them into the clay areas have met with doubtful success owing to the prevalence of wilt. While the

existing coconut cultivations are comparatively inefficient, the increased expenditure on drainage, irrigation and replanting necessary to bring them up to the standard would not be repaid by the unit value of the crop per acre. The exports for 1938 were as follows :—

Coconuts :	...	... 452,942 valued at $4,300.
Copra :	...	... 695 tons valued at $41,613.
Coconut Oil :	...	... 5,277 gallons valued at $2,672.

40. The production of copra in 1938 was 1,781 tons compared with 2,159 tons in 1937. Of this quantity 1,061 tons were sold to the Demerara Oil and Cake Mills, manufacturers of edible oil, and 654 tons exported. Brokers distributed the net proceeds of sales at the following figures :—

March Quarter	...	...	$ 2.03 per 100 lb.
June „	...	...	2.31 „
September „	...	...	2.67 „
December „	...	...	1.73 „

The low price received in December was due to the fact that the Demerara Oil and Cake Mills closed down in January 1939, and informed the Copra Brokers that they would not be able to purchase any more copra, with the result that the remaining stocks on hand had to be exported. The action of the Demerara Oil and Cake Mills was in a great measure due to an anticipated increase in imports of lard following a reduction in the rate of duty on animal lard as a result of the recent Anglo-American Treaty. The position is under investigation and it is hoped that a solution will be found which will enable the local mills to resume operations. The Coconut Products (Control) Ordinance has been referred to in previous reports.

41. Table VII gives particulars of approximate acreage, and exports of coconuts and its by-products from 1929–1938.

TABLE VII.

COCONUT ACREAGES, AND THE PRODUCTION AND EXPORTS OF COCONUTS AND ITS BY-PRODUCTS—1929–1938.

Year.	Area under cultivation (English) acres.	No. of Nuts Exported.	Value in Dollars.	Copra Exported, tons.	Value in Dollars.	Coconut Oil Exported gallons.	Value in Dollars.
1929 ...	29,456	637,812	10,614	3,759	314,350	20,862	16,730
1930 ...	28,052	629,371	7,845	2,010	143,423	26,377	16,059
1931 ...	22,882	1,494,195	13,538	1,381	82,629	20,742	9,254
1932 ...	23,301	962,364	10,484	757	48,936	19,048	10,239
1933 ...	23,452	1,698,175	22,925	921	41,045	20,198	8,904
1934 ...	22,600	2,487,402	32,960	700	23,487	12,662	5,554
1935 ...	21,786	2,737,784	33,891	1,226	55,134	6,699	2,912
1936 ...	21,379	1,914,169	24,755	563	37,051	9,818	4,191
1937 ...	21,600	1,968,665	30,511	716	71,903	13,640	7,456
1938 ...	22,450	452,942	4,300	695	41,613	5,277	2,672

Coffee.

42. The area under coffee in 1938 was 2,714 acres. Of the crops grown locally Liberian coffee is one of the most suited to the pegasse soils, is affected by no serious disease or pest and as the berry remains for a long time on the tree is especially favourable to the casual labour available for picking in the chief coffee growing areas. The output could be increased with little difficulty but, unfortunately, the export market is so restricted and prices have fallen so low that many fields are being abandoned and this is reflected in the acreage tables. Holdings vary much in size depending on the locality and capital or substance of the producer. Farms will be found to vary from one or two acres to about fifty acres ; the larger sized farms occur in the North West and Pomeroon Districts. In recent years, with depressed markets, many farms had to curtail their operations so as to reduce employment of labour outside the family to a minimum. In former years, a fair quantity of local coffee was exported to Scandinavia, but it is said that these countries have recently been obtaining most of their coffee by barter.

43. The exports were extremely low during 1938 being given at 104,803 lb. valued at $5,657—the lowest on record since 1913. A mission consisting of the Director of Agriculture and the Honourable C. R. Jacob visited Surinam with a view to studying conditions in the industry and the method of assistance provided through the Central Coffee Board in operation there. The report of this mission was submitted and the findings incorporated in the report of the Select Coffee Committee of the Legislative Council of which the Director of Agriculture is Chairman. No decision has yet been taken on the report, which has been forwarded to the Secretary of State, but meantime it may be of interest to record several practical points of interest.

44. Liberian coffee has, since the decline of sugar and cacao, become the main agricultural activity of Surinam and as a rule is cultivated on large estates, laid out with regard to drainage, etc., in a similar manner to the sugar estates of this colony, The cultivation is chiefly on clay and sandy loam—very little on pegasse—while the crop is grown under shade provided by a species of Erythrina similar to the local Oronoque. The trees are in many cases pruned to keep them short enough for easy picking and yields averaging 500 lb. per acre for the whole colony are obtained. Marketing difficulties have been met with in Surinam similar to those encountered in this colony, and a Central Marketing Board was organised there in 1935 to deal with these problems. Cured by factory methods, the coffee produced there is, in general appearance, superior to the local product cured by small farmers. For some years the Surinam Government has maintained a research laboratory to study curing methods with a view to improving the flavour and extending the demand. While it may be said that a good measure of success has been achieved in respect to cup quality, the world's coffee market situation is such that low grade types are unable to compete against superior coffees of which there is now an overproduction.

45. Table VIII shows the approximate acreage, exports and values of this crop during the period 1929-1938.

TABLE VIII.

COFFEE ACREAGES, EXPORTS AND VALUES—1929-1938.

Year.	Area cultivated (English) acres.	Exports.	
		Lb.	Total Value in Dollars.
1928 ...	6,212	907,026	104,135
1929 ...	5,363	367,371	22,400
1930 ...	4,899	795,489	33,582
1931 ...	5,800	1,054,451	69,436
1932 ...	4,630	1,143,170	79,594
1933 ...	4,217	710,660	47,238
1934 ...	4,051	471,506	23,849
1935 ...	3,512	373,753	15,626
1936 ...	3,811	451,010	22,902
1938 ...	2,714	104,803	5,657

Citrus and Other Fruits.

46. The area under grapefruit, oranges and other fruit was 459 acres while the acreage under limes was returned at 913 acres. The exports of concentrated lime juice for the year were 7,123 gallons valued at $1,860 and essential oil of limes 539 gallons valued at $20,163.

47. There have been increased plantings of most fruit crops, including mangoes, avocado pears and papaws.

48. In May, 1938, another trial shipment of green limes was made to Canada. Twenty lugs, containing 3,140 limes, in sizes ranging from 148s to 178s, were shipped. The limes realized $35 but after deducting all expenses there was a small loss to the shipper.

49. Table IX shows the imports of grapefruit and oranges into British Guiana during the last five years. It will be seen that the quantity of grapefruit has fallen rapidly, and with the recent introduction of legislation prohibiting the importation of grapefruit from Trinidad the colony will probably become entirely self-supporting in this fruit in future. There is, however, a considerable quantity of oranges imported and although part of these arrive during the off season for local fruit, there is still ample scope for growers of this fruit in the local market.

TABLE IX.

IMPORTS OF FRUIT INTO BRITISH GUIANA—1934-1938.

Year.	Oranges.		Grapefruit.	
	lb.	Value $	lb.	Value $
1934 ...	780,736	8,108	14,215	165
1935 ...	601,770	7,618	1,345	34
1936 ...	546,389	6,190	4,586	82
1937 ...	552,555	6,509	7,215	140
1938 ...	675,653	8,036	2,481	40

50. Table X gives statistics bearing on the citrus industry from 1929-1938. The acreages are approximations only as it is difficult to assess the status of these cultivations under local conditions with any degree of accurancy. With few exceptions continuous care is seldom paid to the cultivations.

TABLE X.

CITRUS ACREAGES, EXPORTS AND VALUES OF CONCENTRATED LIME JUICE AND ESSENTIAL OIL OF LIMES—1929-1938.

Year.	Limes (English) acres.	Citrus and other Fruit (English) acres.	Concentrated Lime-juice Exported. Gallons.	Value in Dollars.	Essential Oil of Limes Exported Gallons.	Value in Dollars.
1929 ...	635	...	12,717	12,019	801	47,585
1930 ...	740	...	11,373	10,855	660	38,352
1931 ...	747	254	8,347	8,014	590	39,806
1932 ...	787	316	958	920	730	44,728
1933 ...	869	328	Nil	...	1,166	65,014
1934 ...	789	371	10,468	2,013	892	32,967
1935 ...	694	656	3,112	689	597	25,092
1936 ...	698	657	9,825	2,422	732	28,569
1937 ...	836	518	5,507	1,576	700	26,071
1938 ...	913	459	7,123	1,860	539	20,163

Vegetable Crops.

51. The area under ground provisions was 13,032 acres. Small increases are recorded in all three counties. The area varies from year to year depending on weather and market conditions and on the amount of wage-earning employment available. Cheap rice also tends to affect the cultivation of these crops.

52. The ill-defined seasons are a serious handicap to the more extensive growing of leguminous food crops and of the more exacting temperate vegetables. Unexpected dry spells at the time of planting or unduly wet weather at maturity do considerable damage. Increasing quantities of black-eye peas (Vigna) are, however, being grown in the Pomeroon District, though the success or failure of the crop is largely dependent on the weather. Local production of these crops might also be bettered if family labour were used more extensively in reaping and threshing. Increased production of peas, beans and even maize, could probably be effected if substantial tariff protection was given against the imported article.

53. Sweet potatoes could be grown in greater quantity but the quality does not compare favourably with the Barbados product, which always fetches a higher price. Local soil and climatic conditions do not produce a sweet potato of equally good flavour and texture. Onions, too, are susceptible to the vagaries of the season, and the locally grown product does not keep well.

54. The sand reef soils of the coastlands require liberal applications of stable manure and regular green manuring in order to produce satisfactory crops of ground provisions and vegetables and even then their low water-retaining capacity renders them very liable to drought effects. Sub-Station Cecilia and a similar station at Whim, Berbice, are valuable demonstrations of the best methods of cultivating this soil, principally for truck-gardening, which is on the increase, especially in the areas served by these stations. School and Home Gardens are also helpful in the campaign for increased vegetable production.

Cacao.

55. The area under cacao was returned at 470 acres, an increase of some fifty acres over the previous year. Cacao enjoys a protected market, and the local output is produced in small quantities without adequate fermentation. Yet it fetches relatively high prices varying from 14 to 18 cents per pound for the manufacture of drinking chocolate, and there is room for some expansion of the industry, particularly in the North West District where Witch Broom has not yet appeared.

56. Table XI shows the area under cultivation and the imports of raw cacao and prepared cacao from 1929-1938.

Table XI.

CACAO ACREAGES, IMPORTS AND VALUES OF RAW CACAO AND PREPARED CACAO—1929-1938.

Year.	Area cultivated (English) acres.	Cacao—Imports.			
		Raw Cacao. lb.	Value in Dollars.	Prepared Ground. lb.	Value in Dollars.
1929 ...	1,514	4,834	539	119,134	19,722
1930 ...	1,514	6,201	637	108,081	18,108
1931 ...	953	9,624	800	121,961	18,250
1932 ...	791	1,147	87	70,764	12,139
1933 ...	797	163	18	109,092	15,187
1934 ...	812	3,832	279	106,201	16,033
1935 ...	843	4,166	273	115,746	16,930
1936 ...	512	30	2	101,261	14,254
1937 ...	422	40	2	128,876	21,778
1938 ...	470	10,274	657	113,147	18,825

Census Returns.

57. From Table XII it will be seen that there has been a decrease in the total acreage compared with the previous year the drop in rice being responsible. Acreage figures may be expected to fluctuate from year to year in this colony due to factors discussed in previous reports, principally crop hazards.

58. Tables XII and XIII show the number of acres under cultivation in the three counties during 1938 and summaries for the period 1929-1938 inclusive.

Table XII.

CROP ACREAGES IN BERBICE, DEMERARA AND ESSEQUIBO COUNTIES, 1938.

Counties.	Nature of Crops and number of Acres under cultivation on December 31, 1938. (English acres).								
	Sugar Cane.	Rice.	Coconuts.	Coffee.	Cacao.	Rubber.	Limes.	Citrus and Other Fruit.	Ground Provisions.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Berbice ...	26,602	21,994	3,966	...	112	...	609	10	3,769
Demerara ...	42,485	15,171	12,650	856	141	16	38	354	7,136
Essequibo ...	...	11,994	5,834	1,852	217	52	266	95	2,127
Total ...	69,087*	49,159†	22,450	2,714	470	68	913	459	13,032

* Includes area under farmers' canes—2,664 acres.
† Does not include acreage for the Spring Crop—12,874 acres—which is grown on the same land.

Table XIII.

SUMMARIES OF CROP ACREAGES—1929-1938.

	Year.	Sugar-Cane.		Rice.		Coconuts.	Coffee.	Cacao.	Rubber.	Limes.	Citrus and other Fruit.	Maize, Plantains, etc., and Ground Provisions.	Total area under cultivation.
		Area cultivated.	Area reaped.	Area cultivated.	Area reaped.								
British Guiana	1929	57,247	56,126	55,745	66,742	29,456	6,212	1,514	1,474	635	...	14,283	166,566
Do. ...	1930	57,244	54,264	52,287	63,482	28,052	5,363	1,514	1,474	740	..	14,312	160,986
Do. ...	1931	61,097	54,999	77,478	83,492	22,882	4,899	953	827	747	254	17,575	186,712
Do. ...	1932	62,905	55,240	73,453	87,941	23,301	5,800	791	880	787	316	17,135	185,368
Do. ...	1933	63,093	55,811	72,161	87,125	23,452	4,630	797	681	869	328	16,635	182,646
Do. ...	1934	61,567	53,966	63,227	70,951	22,600	4,217	812	873	789	371	16,450	169,906
Do. ...	1935	67,914	59,932	70,882	83,566	21,786	4,061	843	679	694	656	13,246	178,544
Do. ...	1936	69,235	63,385	51,041	62,856	21,379	3,512	512	133	698	657	11,359	158,526
Do. ...	1937	70,233	64,890	60,079	70,787	21,600	3,811	422	119	836	517	12,926	170,723
Do. ...	1938	69,087	62,941	49,159	62,033	22,450	2,714	470	63	913	409	13,032	158,352

Livestock.

59. Generally speaking, the management of stock is primitive throughout the colony. Horses and mules receive a certain amount of attention, but cattle, sheep, goats and pigs are usually left to themselves and responsibility begins and ends with ownership. There has been an increase nevertheless, in pig-keeping and poultry-rearing, while the Poultry Association has been resuscitated.

60. The Government Stock Farm in Georgetown, which is managed by the Government Veterinary Surgeon, occupies approximately 34 acres, and is used chiefly as a breeding centre for cattle, pigs and poultry. Pure bred bulls of the diary breeds—Holstein and Guernsey—are held for service at a nominal fee. The improvement of the progeny in type and production is considerable, and indicates that good grade dairy herds are profitable. There are also out-stations with bulls of these breeds, and it is unfortunate that in previous years cattle owners have not made full use of the facilities granted to them. In many instances the bulls were placed with private individuals who did not give sufficient care to these comparatively delicate animals, and several were lost. Sales of good type animals are regularly held at Georgetown, and a system of sale on the instalment plan has proved helpful. Extension of livestock activities, especially in regard to beef types, has been made possible by a grant from the Colonial Development Fund to which further reference is made in paragraph 65.

61. *Food Supply.*—Locally grown foodstuffs which may be included in balanced rations for livestock have been tried out with success and are in general use. The by-products of the sugar, rice and coconut oil industries are the principal feeds, but they are essentially carbohydrate in nature, and deficiencies in the supply of high protein feeds have been made up by imported concentrates. The Demerara Meat Company have recently produced a meat meal-bone-flour mixture which has great possibilities as a source of protein, lime and phosphate. The grasses of the coast-lands are somewhat deficient in lime and phosphate, and a good dairy herd can only be maintained in condition by feeding a mineral ration. On the Government Stock Farm, where a mineral mixture has been fed for some years, the phosphate content of the grass now compares favourably with that of a good British pasture, and although the lime content is still rather low, it shows how the local pastures could be improved by feeding minerals to the animals.

62. The intermediate and hinterland savannahs occupy an area of some 9,000 square miles, and several investigations have been made on the type and composition of the soils and pastures, and on the quality and management of the stock. Extreme phosphate deficiency is the striking fact which emerges from analysis of the natural pastures—a deficiency which is even greater than that of the areas in Kenya which are given in the Sixth Report of the Economic Advisory Council Committee on the Mineral Content of Natural Pastures (1931). It seems clear that the quality of stock in the interior could be greatly improved by grading and by feeding a mineral

mixture, but the present cost of transport of the latter—£8 per ton to Kurupukari on the border of the Rupununi Savannahs—is prohibitive.

63. *Imports of food for livestock.*—Table XIV. gives the imports and value of livestock feeds over the past five years. "Fodder" refers to hay for police horses and race horses, as a regular supply of good fodder cannot be guaranteed in Georgetown owing to weather variations. Although considerable quantities of oilcake and oilmeal are imported, it may be assumed that most of the coconut meal produced in oil extraction is used locally. In districts where home production of crude coconut oil is practised, large numbers of pigs are kept, and the feeding value of this by-product is generally appreciated. Rice-milling by-products are not utilized to the full, but it is anticipated that the introduction of efficient central mills will greatly increase the production of rice meal, bran and polishings.

64. The Demerara Meat Company has recently started the production of animal by-products, bone-meal, blood-meal, etc., and it is believed that this ready source of mineral and high protein feed will stimulate and improve animal husbandry in the colony.

65. Government has encouraged more intensive stock-feeding by allowing the free importation of high protein foods approved by the Director of Agriculture.

TABLE XIV.

IMPORTS OF FOOD FOR LIVE STOCK*

Year.	Total Imports.	Value in Dollars.
Fodder :—		
1934	174,485 lb.	$ 2,906
1935	223,833 „	3,726
1936	172,644 „	2,396
1937	147,454 „	2,237
1938	183,275 „	2,665
Oilcakes and Oilmeal :—		
1934	721,715 lb.	$ 13,457
1935	1,130,959 „	19,506
1336	976,884 „	14,989
1937	1,059,488 „	20,591
1938	808,557 „	17,685
Bran, Pollard and Schumaker Feed :—		
1934	104,302 lb.	$ 1,836
1935	108,932 „	1,992
1936	112,662 „	1,976
1937	102,528 „	2,278
1938	160,968 „	2,711
Cattle Foods of High Protein Content :—		
1937	...	...
1938	123,762 lb.	$ 2,925
Seeds, Feeding :—		
1934	31,499 lb.	$ 1,057
1935 — ...	58,756 „	2,143
1936	78,684 „	4,555
1937	70,130 „	3,493
1938	71,272 „	2,601
Grain Feeding :—		
1934	174,160 lb.	$ 4,416
1935	94,282 „	2,580
1936	75,542 „	2,013
1937	86,320 „	2,629
1938	128,904 „	3,451
Other kinds (Bone Flour, Bone Meal, etc.)		
1934	836 lb.	$ 16
1935	12,708 „	330
1936	13,664 „	305
1937	10,080 „	217
1938	10,211 „	238

* As supplied by the Comptroller of Customs.

66. *Animal Health.*—An outbreak of Anthrax occurred in the Berbice District. No other infectious disease has been reported.

67. *Colonial Development Fund Grant.*—During 1937 a free grant of £3,000 ($14,400) was received from the Colonial Development Fund to provide for the improvement of cattle in the Colony. Twelve Herefords and Red Polls were imported and the extension of the existing livestock unit at the Georgetown Station has been proceeded with. The La Belle Alliance agistment area is also in full swing while similar work is proceeding at Whim.

68. *Census Returns and Exports.*—The returns for livestock in the three counties for the year 1938 are given in Table XV while Table XVI gives the stock returns for the years 1933-1938. The exports of horned cattle and swine from 1933-1938 with values are given in Table XVII.

Table XV.

LIVESTOCK RETURNS IN BERBICE, DEMERARA, ESSEQUIBO AND RUPUNUNI, 1938.

County.	Horses.	Mules.	Donkeys.	Cattle.	Buffaloes.	Sheep.	Goats.	Swine.
Berbice	496	439	4,349	41,959	...	21,984	6,486	16,194
Demerara	562	1,079	2,177	33,146	32	8,771	4,465	7,509
Essequibo	27	16	814	6,809	21	1,437	1,298	2,032
Rupununi	1,593	12	4	53,037	...	470	30	683
Total	2,678	1,546	7,344	134,951	53	32,662	12,279	26,418

Table XVI.

LIVESTOCK RETURNS—1933-1938.

Year.	Horned Cattle.	Horses.	Mules.	Asses.	Buffaloes.	Sheep.	Goats.	Swine.
1933	159,935	5,616	1,594	7,582	170	35,064	22,408	18,769
1934	149,662	2,888	1,612	6,127	82	17,809	8,980	14,110
1935	128,211	2,874	1,545	6,165	61	27,584	12,191	22,600
1936	131,167	2,817	1,225	5,962	95	26,310	11,341	22,480
1937	129,540	3,025	1,642	7,391	86	33,273	2,497	26,667
1938	134,951	2,678	1,546	7,344	53	32,662	12,279	26,418

Table XVII.

EXPORTS OF CATTLE, SWINE AND POULTRY—1933-1938.

	1933.		1934.		1935.		1936.		1937.		1938.	
	No.	Value. $	No.	Value. $	No.	Value. $	No.	Value. $	No.	Value. $	No.	Value. $
Cattle, Horned ...	458	7,173	920	11,909	349	4,770	95	1,229	578	5,830	1,111	11,105
Swine	413	1,593	973	3,561	544	1,768	321	1,222	579	2,316	941	3,765
Poultry ...	...	...	...	...	...	...	...	...	...	...	...	3,687

SECTION II.

WORK OF THE DEPARTMENT OF AGRICULTURE.

Establishment.

69. The senior personnel of the Department of Agriculture at the end of 1938 including the Director of Agriculture, comprised seven officers in the Research Branch, one acting Livestock Officer, four District Superintendents, one Assistant Superintendent, one Field Manager in the Field Branch, and one Rice Grading Inspector—a total of 16 in all.

70. The junior staff comprised three agricultural instructors, two agricultural assistants, 8 Technical or Field Assistants (two in the Research Branch, 3 in the Field Branch, 1 in the Meteorological Branch, 2 in the Rice Grading Branch) together with miscellaneous unclassified appointments and a clerical staff of 10 (at Headquarters).

71. The following new appointments were made during the year :—

Mr. O. F. J. Churaman, Dip. Agric., was appointed Agricultural Instructor as from August 24, 1938.

Mr. T. Bell, B.S.A., A.I.C.T.A., formerly Assistant Manager of the Government Stock Farm and Agricultural Station in Palestine was appointed Agricultural Superintendent as from November 23, 1938. He arrived in the colony and assumed duty on December 13.

Miss S. Lord, Probationer, General Registrar's Office was appointed probationer in the Department as from September 12, 1938.

72. *Transfers.*—Mr. J. D. Gillespie, B.Sc., Agricultural Superintendent, was transferred to Sierra Leone as Agricultural Officer. He left the colony on August 30.

Captain F. Burnett, M.C., M.A., Deputy Director of Agriculture, was transferred to Jamaica as Commissioner for Land Settlement with effect as from December 9. Mr. Burnett was on leave in the United Kingdom when the transfer was effected.

Miss N. Green, Class III Clerk, was transferred to the General Registrar's Office with effect as from September 12, 1938.

73. *Retirement.*—Major T. Bone, O.B.E., M.R.C.V.S., Government Veterinary Surgeon, retired from his post after ten years' service in the colony during which time a considerable enlargement in scope of the Department's livestock investigations and activities has taken place.

74. *Leave.*—The officers who were on leave during the year and those who held various acting posts are shown below :—

The Director of Agriculture and the Honourable C. R. Jacob left the colony on January 29 for Surinam on a special mission to study the situation in regard to the coffee industry and the recently organised Surinam Central Coffee Board. On the Director's return on February 5 he proceeded to Trinidad to represent British Guiana at the Conference of the British West Indian Fruit and Vegetable Council held from February 9 to 15. During the Director's absence, Captain F. Burnett, Deputy Director, was appointed to act.

Mr. L. D. Cleare, Entomologist, was granted 3 14/30 months' leave of absence on full pay and 2 3/30 months' on half pay. While on leave he represented this colony at the Entomological Congress held in Berlin. He returned to the colony on October 21, 1938.

Miss V. Chan-Choong, Librarian, was granted three months' leave of absence as from June 1, 1938, with an extension of one month's half pay leave on its completion. She resumed duty on October 1, 1938.

Mr. H. E. H. Gadd, Grading Inspector, was granted three months' full pay leave in the United Kingdom as from June 2, 1938, and an extension of three months' on half pay on its completion. He returned on December 16, 1938.

Major T. Bone, Government Veterinary Surgeon, was granted 4 7/30 months' leave of absence in the United Kingdom as from June 3, 1938, prior to his retirement. Mr. H. A. Fraser was gazetted to act as Government Veterinary Surgeon during his absence.

Captain F. Burnett, Deputy Director, was granted 4 3/30 months' leave of absence in the United Kingdom as from July 21, 1938 and an extension on half pay from November 24 to December 9, 1938. During his absence, Mr. E. M. Peterkin, Agricultural Superintendent, was appointed to act as Deputy Director.

Mr. J. D. Gillespie, Agricultural Superintendent, was granted 1 28/30 months' leave of absence in the United Kingdom prior to assumption of duty in Sierra Leone, where he has been transferred as Agricultural Officer.

Mr. W. G. Delph, Registrar of Banks, was granted 6 months' leave of absence in the United Kingdom as from December 23, 1938.

75. *Administration.*—The administrative work of the Department was particularly heavy during the year, largely owing to the difficulties created by the continued depression in price of all agricultural commodities, and the necessity for close examination of any measure or proposal, however small, calculated to be of benefit to agriculture. Meetings of various committees and boards, interviews and conferences have absorbed a great deal of the time of the Director, together with Executive and Legislative Council's work. In addition, during the latter part of the year a comprehensive memorandum on agricultural conditions in the colony and the work of the Department of Agriculture had to be prepared for the Royal Commission. The calls made on the staff were many and varied and I desire to record my appreciation of the ready response and co-operation given by all grades.

A.—THE FIELD BRANCH.

76. The Field Branch of the Department of Agriculture is responsible for all extension activities. The work of this branch is under the immediate supervision of the Deputy Director of Agriculture. Details of the organisation of the field branch are as follows :—

Berbice	...One Agricultural Superintendent, one Assistant Superintendent, one Agricultural Instructor and one Technical Assistant.
Demerara—	
East Demerara	...One Agricultural Superintendent, one Agricultural Instructor, one Technical Assistant, one Agricultural Assistant and one Technical Assistant.
East Bank & Botanic Gardens, Georgetown.	One Agricultural Superintendent, one Agricultural Instructor and one Field Assistant.
West Demerara	...One Agricultural Superintendent and one Field Assistant.
Essequibo Coast and Islands.	One Agricultural Superintendent, one Agricultural Assistant, one Technical Assistant and one Assistant for Rice grading.
North West District	...One Technical Assistant.

77. In addition to the normal extension activities of this branch, officers are in charge of the Experiment Stations in their districts and the detailed work at these Stations is described in the respective Divisional Reports published separately.

1.—Investigation and Extension.

Pure Line Padi Seed Distribution.

78. The extension of pure line seed padi in the rice growing centres throughout the colony continued to form one of the most important duties of the divisional agricultural staff and a vigorous campaign of education and propaganda is maintained in all districts. Several schemes are in operation to facilitate this. First, the establishment of multiplication blocks to ensure a reserve of seed which may be (*a*) sold at current prices of padi ; (*b*) used in exchange for ordinary padi which is then sold to millers, or (*c*) loaned to responsible cultivators and village authorities to be returned in kind at the end of harvest. Circumstances determine the procedure to be followed, depending on type of cultivator, conditions in the district, etc. Secondly, the establishment of private seed farms operated under the aegis of the Department. These are worked by the cultivators themselves who are specially selected by the District Officers or in conjunction with the landlord-miller. The Agricultural Officers instruct the farmers in such matters as roguing and selection, handling the seed at

harvest time, etc. Briefly, each cultivator receives, free of cost, enough pure line seed to start a nursery, plants from which will set about $\frac{1}{3}$ acre, *i.e.*, about 10 lb. seed. From this the cultivator should reap in an average season enough to plant from 24 to 32 acres, if it were all utilized for planting. He is given a certificate by the Department, and may sell his padi for seed purposes. Padi cultivators exchange padi and trade in small quantities amongst themselves. Sometimes arrangements are made by the Department to take over the crop of a private seed farm, treating it as a multiplication block. During 1938 there were 627 of these farms in operation. Thirdly, the organisation of field competitions and the award of prizes on a systematic basis provides a further stimulus to the general effort at maintaining the standard of purity.

79. A recent investigation of the status of padi cultivation in the colony in regard to purity revealed that 73.6 per cent. of the total acreage under rice is of a purity greater than 75 per cent.

80. The following table gives particulars of seed padi distributed during the year under review :—

District	Pure line seed (Departmental stocks) Bags (of 140 lb.)	
Berbice ...	405	
East Demerara ...	451	
West Demerara ...	$118\frac{3}{4}$	
Essequibo and Islands ...	$203\frac{1}{2}$	$1178\frac{1}{4}$*

* Equivalent to 164,955 lb.

Citrus.

81. The distribution of budded plants was continued and a comparison between 1937 and 1938 is shown in Table XVIII.

82. The Citrus orchard at Hosororo, which had been showing a tendency to form too much woody growth, was drastically pruned in May. In addition, dressings of artificial manures were applied to some of the more backward trees in an endeavour to increase both the quantity and quality of their fruit.

83. Table XVIII indicates the distribution of citrus plants during the period 1936-1938; the total distribution from 1928-1938 amounted to 34,743 plants. This does not take into account plants raised in private nurseries. As already noted the after care of plants when set out leaves much to be desired.

TABLE XVIII.

DISTRIBUTION OF CITRUS—1936-1938.

	Demerara.			Berbice.			Essequibo.			North West District.			Total Distribution.			Total Distribution.
	1936.	1937.	1938.	1936.	1937.	1938.	1936.	1937.	1938.	1936	1937	1738	1936.	1937.	1938.	1930–1938.
Budded Oranges ...	367	452	341	141	101	70	177	26	61	...	...	...	685	579	472	7,243*
,, Grapefruit..	231	49	125	68	18	60	156	2	9	...	...	...	455	69	194	5,840*
Dancy Tangerine ...	...	...	46	...	...	2	...	...	...	...	...	...	...	...	48	48
Budded Limes ...	6	10	...	...	1	...	...	...	...	...	...	...	6	11	...	4,521
Seedling Limes ...	66	24	...	7	4	...	3	...	...	...	...	...	76	28	...	16,589
Total ...	670	535	512	216	124	132	336	28	70	...	...	...	1,222	687	714	34,241

* During 1928 and 1929 a total of 502 budded oranges and grapefruit were distributed but not listed separately, making total of 34,743 plants.

Banana Experimental Plots.

84. In 1937, the Department undertook to lay down two five-acre experimental areas, further to investigate the economic possibilities of the Gros Michel banana and to secure data as regards likely production. One five-acre plot was located at

Supply, East Bank, the other at Middlesex, No. 2 Canal, West Bank. In the 1937 report it was stated that the plots were badly attacked by Cercospora leaf spot and in addition, some 10-15 per cent. of the plants were attacked by Panama Disease.

85. Owing to the unusually wet weather for the greater part of 1938 the Cercospora Leaf Spot Disease continued to be serious both at Supply and Middlesex, and spraying was very difficult to carry out. Both Bordeaux Mixture and a new proprietary compound, Perenox, were applied, but owing to the poor condition of the plants otherwise, no appreciable degree of control was afforded by either spray. Furthermore, by the end of the year the plot at Middlesex had suffered over 50 per cent. loss from Panama Disease, the plot at Supply about 10 per cent. On both plots heavy Gas Oil was applied to the stumps of plants affected with this disease.

Minor Crop Trials.

86. In the 1937 report a resumé was given of the Department's efforts with new varieties of crop plants and miscellaneous introductions for the ten-year period 1927-1937. These included: Cassava, maize, peas and beans, soya beans, groundnuts, sweet potatoes and yams, green manures and cover crops, forage crops, tobacco, oil palms, fibres, citronella oil, fruit crops, spices and peppers and various truck garden crops.

87. During the year under review systematic attention has again been paid to most of these minor crops and the more important are dealt with under their respective heads in the following paragraphs.

Tobacco.

88. In the 1937 report a resumé of the investigations with tobacco was given. It was indicated therein that as a result of the increased manufacture of cigarettes locally the demand had veered from the heavy to the bright leaf types and, in order to stimulate local production, plans were being made for conducting a series of trials with flue-cured tobacco in the hope of providing some subsidiary occupation for those whose employment might be adversely affected by the quota limitation of the sugar output. In 1938, a small experimental flue-barn, capable of an output of 100 lb. of leaf at one curing was erected, and seed of the "Gold Dollar" variety was obtained from South Carolina. This strain had been specially recommended by Dr. Nierenstein of the Imperial Tobacco Co., Ltd., Bristol, England, when on a visit to the colony.

89. Two crops of this strain were grown but were adversely affected by the very abnormal distribution of the rainfall. From January to April the excess over the normal totalled 27.93 inches; there was again an excess of 7.38 inches in August and a deficit of 6.46 inches in December. Excessive rains also hampered the harvesting and curing operations.

90. Despite these setbacks, the yield of the spring crop was 564 lb. of cured leaf per acre which, on sale to local cigarette factories, yielded a profit, on cultivation and curing costs (excluding capital cost of barn) of $25.29 per acre. The autumn crop was severely damaged by the rains and less than one-third of the area originally prepared and planted came to maturity. From the half acre reaped, 175 lb. of cured tobacco was sold for $93.19.

91. The reports on the cured product have been very encouraging and further work with tobacco will be conducted during 1939. Considerable interest has been aroused among farmers and there is a demand for seed, information concerning curing sheds, etc. Meantime, extension of cultivations is taking place, especially on the sand reefs on the upper East Coast of Demerara. In a few instances, farmers are trying simple methods of artificial curing but there is still heavy loss from mildew, while there is difficulty in securing the required texture of the leaf due to excessive growth. Colour, on the whole, appears to be satisfactory. The Board

of Agriculture considered the whole project very carefully and thought that as air curing was not likely to be successful under local conditions, the only alternative was to secure expert assistance through the Colonial Development Fund and a recommendation to that effect was sent forward by Government. Laboratory work with tobacco is also proceeding and is dealt with in the Chemical Section.

92. During the year 2 lb. 7½ ozs. of seed and 1,512 seedlings were distributed to farmers throughout the colony.

Peas and Beans.

93. Cultivation of these crops has been urged with the object not only of securing the benefits to be derived from the use of a legume crop but also of increasing the local food supply for man and livestock. Seed of the best types of pigeon peas has been distributed to farmers while the use of black eye peas as a crop has been encouraged both to provide an effective and quick soil cover and because these peas are among the most popular consumed locally. This crop is now one of the most important in the Pomeroon District and seed, whenever available, has been distributed from the various Experiment Stations. As a further incentive, 25lb. of various beans were obtained from Messrs. Hastings, Georgia, and distributed to farmers in the mining areas. The cultivation of peas and beans in the various school gardens of the colony is also being pushed.

94. Seed plots have been systematically maintained of other edible types such as Dwarf Bonavist (*Dolichos lablab var.*), Finger-shaped Bonavist (*D. lablab var.*), Waby Bean (*D. lablab var. macrocarpa*), Henderson's and Nigerian Bush Lima and various salad beans, Cow Peas, Mung and Urid. In addition, another introduction, of seven varieties of Pigeon Pea (*Cajanus Cajan*) from Pusa, India, was made together with new varieties of beans from Messrs. Sutton & Sons, Calcutta, and Messrs. Peter Henderson, U.S.A.

95. Certain types of dried pulses, *e.g.*, split peas (dholl) and beans, figure among commodities imported and are deserving of more attention by farmers, especially where family labour is available for threshing, etc. Attempts to obtain suitable and non-expensive machinery for splitting local peas have not been so far successful but efforts are continuing. Indian grindstones are useful but do not turn out a sufficiently well finished commercial product.

Ginger.

96. This crop is cultivated to a small extent in the North West District and it is hoped to extend the market, at present confined to green ginger, for which there is only a limited demand, to include cured ginger, now chiefly imported from West Africa. The quality of the imported article is by no means high and given a normal amount of dry weather the local farmers should be able to turn out a satisfactory article to compete with it. Results appear to be promising at the time of writing but the important question is one of price.

Forage Crops.

97. Local and imported varieties of fodder crops, with a view to improving the forage supply, have been under observation again during 1938. The crops grown include the following :—Uba cane, Elephant Grass, Guatemala Grass, Demerara Primrose, Guinea Grass, Para Grass, Wynne Grass, Horse Weed (*Alisycarpus vaginalis*), Teosinte (*Rena luxurians*) and *Indigofera endecaphylla*. Of the imported crops, Guatemala Grass, Teosinte and Indigofera have given the most promising results ; Demerara Primrose and Horse Weed have also found much favour

98. From the Central Station alone during the year 39,000 cuttings of *Indigofera endecaphylla* have been distributed as well as 3,000 cuttings of Demerara Primrose, in addition to small quantities of the other fodder plants, many of which have now been well established in the colony. Guatemala and Para Grasses are favourites for cut forage.

Green Manures and Cover Crops.

99. The locally grown legumes under observation at the Central Station during the year included : *Crotalaria spectabillis, C. quinquifolia, C. usaramoensis, C. striata, C. sp., Centrosema pubescens, Calapagonium mucunoides, Dolichos hosei, Indigofera hirsuta, I. endecaphylla, I. sp., Pueraria javanica, Phaseolous semi-erectus, Tephrosia hookeriana,* and *Sesbania speciosa.* The results indicate that the most promising cover for orchard or coconut cultivation is *Indigofera endecaphylla* which is in addition very useful as a fodder grown between Guatemala grass, etc.

100. The Bengal Bean, *Mucuna aterrima* has been found particularly suitable for weed control. It is easy to establish and will last for 11-13 months, but on account of its vigorous climbing propensities is of little use as a cover in an established cultivation.

101. *Dolichos hosei* is another green manure which has given promising results during long rainy periods under orchard conditions. *Canavalia* has given moderately good results as a cover and is also suitable for use as a green manure. Some of the Vigna group (particularly black eye peas) has given good results as smother crops, while the black eye pea is also a money crop. In spite, however, of free distributions of seed from the Experiment Stations, the area cultivated by farmers is small.

Soil-less Vegetable Gardening.

102. Great interest has been aroused by the recent development of vegetable growing in water—or sand—cultures. The extreme infertility of most diamond and gold-bearing areas of this colony has been a deterrent to development of the interior, and applications of fertilisers to the light sandy soils would be wasteful on account of losses in drainage water. The cost of transport is so high that in the Potaro District onions have been sold at 2/- per lb ; and even the small patches of moderately fertile soil are difficult to develop because of the ravages of ants. An attempt is being made to find a simple inexpensive technique, which could be used by gold and diamond prospectors and would also be of value to householders in towns and villages where soil conditions are a great deterrent to gardening.

Land Settlement.

103. In order to secure more reliable data in regard to possibilities of developing small homesteads, the Department drew up a scheme in 1936 for a limited number of experimental farm settlements to be worked under the supervision of the District Agricultural Officers. The primary object of these settlements was to provide information on which recommendations could be made regarding questions such as the optimum acreage for an economic farm for a small farmer under local conditions, the capital costs, the labour units required to operate such a farm and the returns to be expected. Further, it was intended that such settlements should be useful not only for the information gained but also to assist materially in demonstration work.

104. *Pln. Toevlugt.*—In 1937 one such farm unit was established at Pln. Toevlugt, West Bank, Demerara, and five acres laid out as indicated in paragraph 81 of the 1937 report. In 1938, an additional area of four acres was drained, out of which $2\frac{1}{2}$ acres were cleared. The unit of ten acres was made up of 6 acres under permanent, semi-permanent and temporary crops, $\frac{1}{2}$ acre under fodder grass, $1\frac{1}{2}$ acres wood lot, $1\frac{1}{6}$ acres cassava varieties and $\frac{5}{6}$ acres fallow. The originally cleared six acres were entirely devoted to arable farming and to the establishment of permanent crops such as oranges, grapefruit and coconuts. Crops of plantains, tannias, cassava, sweet potatoes, etc. were also established.

105. The farm suffered from the abnormally high rainfall for although the site was well drained and no flooding occurred yet the heavy clay soil was so compacted that on the whole poor yields were obtained from the crops reaped. Better cultivation was only possible towards the end of 1938.

106. *Anna Regina Estates.*—The Anna Regina Estates were leased to the Honourable S. H. Seymour and Mr. Sase Narayan jointly for the year 1938.

107. *Bush Lot Land Settlement.*—The health of the Bush Lot Settlers may be considered as normal for the year under review. In accordance with the usual custom the Settlers' padi was put up for tender and the sale effected through the Agricultural Superintendent, deductions for Settlers' debts to Government being made at the time of sale. For the spring crop 63 bags were sold at $1.44 per bag and for the autumn crop 2,124 bags at $1.34 per bag. The amount collected was $1,367.18. The extensive repairs required to the Settlers' houses reported in 1937 were undertaken as far as possible. The kindergarten school in the settlement was well conducted during the year. A home garden competition was held in November; the plots were maintained very creditably, seventeen Settlers entering for the competition. A statement of the revenue collected from the Anna Regina Estates and Bush Lot Land Settlement is given hereunder:—

Lease of the Anna Regina Estates ...	...	$ 1,500 00
Bush Lot Rents ...	...	766 19
Sale of cottages ...	...	489 00
Scale of Scrap ...	...	145 87
Sale of steers, house rents, etc.	...	72 00
Refund of advances—Bush Lot Settlers ...	...	841 94
Interest on advances	...	27 07
		$ 3,842 07
Less amounts brought to account by Treasury during 1939	...	713 67
Total Revenue	...	$ 3,128 40

Beekeeping.

108. The year was a disappointing one for the beekeeper. The rains were unusually prolonged and converted what it had at first been hoped would be an export surplus into the shortest crop of recent years. Not only were poor returns per hive obtained, but in many cases beekeepers lost a high percentage of their hives from wax moth attack and from absconding. One effect of the year's experience has been to focus attention on the necessity for ensuring the supply of food to bees during unfavourable periods. In this connection, the Department's apiary has experimented with the construction of a Division Board Feeder. After several trials the type now in use gives little difficulty either to the maker or the user and has received favourable comment from those beekeepers who are acquainted with it.

109. 218 Italian queens, bred at the Department's apiary, were distributed, compared with 196 in 1937 and 153 in 1936. The demand for these queens has been steadily growing since the Department commenced breeding in 1932.

110. Observation on the weights of three scaled hives is maintained, weights being taken daily and increases and decreases noted.

111. During the year an out-apiary has been established on the East Bank of the Demerara River about 10 miles from the city. The Department's apiary in the Botanic Gardens, built up now to over 100 hives, has thus far found it necessary to concentrate almost entirely on queen production, and the need has long been felt for out apiaries in localities where the problems of commercial beekeeping could be studied practicably. The need of such apiaries for demonstration is also realized.

112. On account of the Department's extension work, coupled with widespread improvement of the stock by the distribution of Italian queens on the one hand and the advertisement of honey on the other, the number of beekeepers in the colony

and the output have increased markedly during recent years. As a surplus, over consumption appeared likely at the end of 1937, a joint venture by a commercial firm and the Beekeepers' Association was made with a trial shipment of about a quarter ton of honey. The report on this consignment stated: "Nobody was inclined to pay more than 4.2c per lb. which is the value of Cuban honey. The colour of the honey was all right." The price was disappointing but it is hoped that when further experience is gained with marketing, better prices will be forthcoming.

113. The Department made use of the services of an experienced beekeeper on a visit abroad to secure a representative collection of samples of different honeys on sale in the United Kingdom shops. These samples, with prices labelled are now on view at the Department's head office and should supply useful information in regard to the demands of the overseas market.

114. Berbice in general, and the Corentyne in particular, is the area in the colony in which the number of beekeepers has been increasing most steadily. As it was not possible to purchase bee equipment nearer than Georgetown, several complaints were made about the hardship felt. During the year under review, the Department made representation to Messrs. Davsons, Ltd., New Amsterdam, and was successful in obtaining that firm's co-operation, with the result that Berbice beekeepers are now able more easily to obtain modern equipment.

115. Visits were made by members of the Beekeeping Division to East Coast, Demerara; West Coast, Berbice; Eastern Berbice and Essequibo.

116. The Department of Agriculture, Ottawa, Canada, kindly loaned the Department a series of coloured lantern slides on beekeeping. These, together with previously owned slides were used to illustrate talks at several centres in the country districts of the colony. At most of the meetings, particularly that at Mahaicony, which is an important beekeeping area, large and interested audiences attended.

Botanic Gardens and Nurseries.

117. The excessive rain during the first eight months of the year followed immediately by dry weather was naturally inimical to the garden, and the display of annuals and perennials in the beds and borders suffered accordingly.

118. An additional sum of $1,000 voted on the estimates for re-conditioning the by-roads enabled the main avenue and the extension through the Experiment Station, together with the majority of the foot paths, to be put in good order. The North Serpentine Avenue was resurfaced and opened to vehicular traffic again after being closed for some years.

119. *Economic Section.*—In the nurseries the propagation and distribution of economic and ornamental plant material was continued as usual. Experiments carried out with 'Hortomone A'., a proprietary substance to stimulate the rooting of cuttings, did not show any great advantage to be gained from the use of this substance, but some work begun on the growth of vegetables in sand, to which the necessary minerals are added in solution (soil-less plant growth) yielded promising results which may prove of considerable practical value to miners and loggers working in the interior of the colony. The demand for papaws, pears and mangoes from the Economic Nurseries has increased.

120. *Seed and Plant Exchange.*—The usual exchange of seed and planting materials with allied institutions was maintained during the year, two notable ornamental introductions being the Yellow Lotus Lily, *Nelumbium luteum*, from Jamaica and a new species of Victoria Lily—*V. cruziana*, from New York. In the Economic Sections, suckers of several varieties of cooking banana were obtained from Panama and some new types of guava from Bombay. The Department was again indebted to Trinidad for ornamentals and economics, both plants and seeds being exchanged, while three varieties of maize were received from the Imperial College. A welcome addition of cuttings of *Derris elliptica* was

received from the Department of Agriculture, Trinidad. Wampee seed was received from the Queensland Department of Agriculture and mango seeds from the Puerto Rico Agricultural Experiment Station at Mayaguez, while Messrs. Sutton & Sons of Calcutta, India, sent thirteen varieties of vegetable seed. The Mauritius Department of Agriculture sent seeds of avocado pear and several varieties of peas were obtained from the Botanical Sub-Station at Pusa, India ; Messrs. Ferry-Morse Seed Company, California, supplied four varieties of lettuce seed for trial, while seed of girigiri was obtained from Nigeria. We are also indebted to the Barbados Department of Agricultural for frangipani cuttings, the Agricultural Experiment Station, Paramaribo, the Instituto Agronomico do Estado, Brazil, and to various Rice Experiment Stations in India for padi of different varieties. The United States Department of Agriculture sent various seeds and plants on request and palm seed was again exchanged with the Coconut Grove Palmetum.

121. A detailed list of introductions of all planting material, both economic and ornamental, is published quarterly in the Agricultural Journal of B.G. Plants and seeds sent to various places abroad included :—Sugar-cane cuttings, seed padi, assorted vegetable seeds, ginger, palm seeds and various ornamentals.

Plant and Seed Distribution.

122. Table XIX gives the planting material distributed locally by the Department during 1938, and the total distributions from 1928–1938.

Table XIX.

PLANT AND SEED DISTRIBUTION, 1938, AND TOTAL DISTRIBUTION 1928–1938.

Field and Garden Crops.

	Distribution 1938.	Total Distribution 1928–1938.
Sugar Cane	...221,780 cuttings	2,931,580 cuttings
Padi (seed)	...164,955 lb.	1,865,944 lb.*
,, (seedlings)	... ...	260,000
Plantains	... ...	4,143 suckers
Bananas	... 492 suckers	12,090 ,,
Papaw (seed)	...11 lb. 12 ozs.	21 lb. 2 ozs.
,, (seedlings)	... 732	4,587
,, (fruit)	... 540	540
Grape Vine	... 48	282
Tobacco (seed)	... 2 lb. 7½ ozs.	31 lb. 3½ ozs.
,, (plants)	... 1,512	3,164
Legumes (cover crops)	... ...	2,047 lb.
Peas and Beans (edible)	... 322 lb.	3,177 lb.
Soya Beans	... 3 lb.	500¾ lb.
Fodders (various)	... 42,000 cuttings	362,576 cuttings
,, ,,	... ...	600 tops
,, ,,	... ...	1,500 plants
,, ,, (seed)	... 2 lb.	2 lb.
Onion (seed)	... 28 lb.	487 lb.
,, (seedlings)	... 1,008 lb.	124,783 lb.
,, (bulbs)	... 89 lb.	107½ lb.
Tomato (seed)	... 3 lb. 4 ozs.	24 lb. 8 ozs.
,, (seedlings)	... 1,036	22,150
,, (cuttings)	... ...	92
,, (fruit)	... ...	1,164
Ground Nuts	... 104 lb.	605 lb.
Sorghums	... ...	50 lb.
Eschallot	... 94½ lb.	178 lb.
Cabbage (seed)	... ...	7¾ lb.
,, (seedlings)	... 186	1,108
Cauliflower (seed)	... 2 ozs.	4 ozs.
,, (plants)	... 36	42
Jerusalem Artichoke	... ...	238 lb.

		Distribution 1938.	Total Distribution 1928–1938.
Indian Kale	...	800 suckers	1,030 suckers
Boulanger (seed)	...	2 lb. 14 ozs.	5 lb. 3 ozs.
,, (seedlings)	...	480	2,022
French Calalu (seed)	...	6 ozs.	6 ozs.
French Calalu (seedilngs)	...	700	700
Ginger	...	...	23¼ lb.
Sweet Corn	...	...	6¾ lb.
Broom Corn	...	...	74 lb.
Jute	...	...	3 lb.
Vegetable Seed (assorted)	...	7½ lb.	73 lb.
Chili (seed)	...	...	96 lb.
,, (seedlings)	...	...	2,396
Sweet Potato (cuttings)	...	34,875	315,445
,, ,, (tubers)	...	1,195 lb.	4,339 lb.
Cassava	...	...	21,170 cuttings.
Ground Provisions (Eddoes, Tannias, Dasheens and Yams)	...	47½ lb.	1,257½ lb.
Pineapple	...	...	472 suckers
Krowa	...	...	37 ,,

Orchard Crops.

Citrus (budded) Oranges	...	520 plants	7,291 plants
,, ,, Grapefruit	...	194 ,,	5,840 ,,
Limes (budded)	...	3 ,,	4,524 ,,
,, (seedlings)	...	...	16,589 plants
Coffee (Arabian)	...	...	1,438 seedlings
,, (Liberian)	...	4 seedlings	12,375 ,,
Cacao	...	1,115 seedlings	11,982 ,,
,, (pods)	...	57	325
Mangoes (grafted)	...	165 plants	1,012 plants
Pears (grafted)	...	97 ,,	442 ,,
Nutmeg (seedlings)	...	97	472
Other Economics	...	1,066 plants	10,780 plants
Seed Coconuts	...	181 ,,	271 ,,

* Exclusive of 801,780 lb. distributed from 1934–1936 for flood and drought relief measures.

II.—AGRICULTURAL EDUCATION.

General.

123. The gradual education of any farming community is an uphill task and on the activities of the District Officers much of this work evolves. It has been dealt with in broad lines under extension and investigation. The spoken word has been re-enforced in recent years by the publication of a small but entirely practical Journal—" The Farm Journal "—which appears quarterly and for which only the small sum of one penny per copy is asked. The circulation is rapidly increasing among all classes of readers. In addition, simple graphs and posters of various agricultural activities have been prepared and are proving helpful at Exhibitions and at meetings with farmers. In time it is hoped to supply copies of these to the elementary schools. In regard to contacts with the individual farmers, it should be noted that this has been affected in the case of practically all cane farmers and, to a large extent, with rice cultivators through the private seed farm work already mentioned. Steps are now being taken which it is hoped will lead to an extension of the system of individual contacts and the preparation of a card index of the colony's farming population. This cannot all be accomplished at once and work of this nature to be carried out systematically will entail an increase in the subordinate district staff. Below some of the special features under " Agricultural Education " are recorded.

School Gardens.

124. There are now twenty-six school gardens registered by the Department, which are situated as follows:—

Georgetown, one; East Coast, Demerara, four; West Coast, Demerara, three; West Bank, Demerara, two; West Coast, Berbice, three; Corentyne, six; East Bank, Berbice, one; Essequibo, three; Wakenaam, two. The work forms part of the schools' daily curriculum. while the agricultural officers visit the gardens regularly giving advice and criticism where required.

125. Seed obtained from Messrs. Sutton & Sons, Reading, England, Messrs Peter Henderson & Co. New York, and Messrs. H. G. Hastings, Co., Atlanta, has been distributed free to all gardens. On the whole, considering the difficulties to be faced, satisfactory progress is being made. Encouragement has also been given to various unaided school gardens by way of free distribution of seed, and the District Officers have visited and given instructions whenever possible. Home gardens have also been fostered and assisted in every way.

Field Days.

126, On account of labour disturbances in the various districts, no field days were organised at the Central Stations during the year, but plans are in hand for at least five during 1939.

Berbice Agricultural Exhibition.

127. An Agricultural Exhibition has been planned for Berbice early in 1939. A considerable amount of propaganda work has been carried out, prize lists printed and distributed and seed and seedlings distributed free. This Exhibition was originally planned to take place in 1937 but has had to be postponed for various reasons. It is hoped that no further postponement will be necessary.

Field Competitions.

128. A useful feature of district work is the organization annually of field competitions. The following were held during the year:—

Pure Line Seed Padi.—For the best pure line padi seed farm and for the subsequent care taken of the seed harvested. The area established and the seed reserved to be sufficient to supply the growers' seed requirements for the following season's planting.

Mixed Provision Farms.—For the best cultivated mixed provision farms the area cultivated by each entrant to be not less than one-quarter of an acre in extent.

Tobacco.—For the best cultivated one-quarter acre of Tobacco and for one 10 lb. sample of cured leaves prepared from the cultivation.

129. The padi competitions were held in the following districts:—Berbice: Lower and Upper Corentyne and West Coast; Essequibo—Coast and Wakenaam and Leguan Islands. The mixed provision farm competitions were held on the West Coast Berbice (from Abary to Fort Wellington, and from Fort Wellington to Ithaca) and on the East Coast Berbice (from New Amsterdam to No. 50, and from No. 50 to Crabwood Creek). The tobacco competitions were confined to the Essequibo Coast. Money prizes were awarded to the various prize-winners.

III.—Miscellaneous.

Imperial Institute Exhibition.

130. The Colony's court at this Exhibition having fallen very much behind the standard of its neighbours, arrangements were made during 1937 to renew most of the exhibits and improve the manner of their display. The Agricultural Section plays a major part in the exhibit, and in order to better this the Department undertook to obtain material, chiefly photographic, illustrating in detail the sugar and rice industries. A very good set of photographs of the sugar industry,

both in the field and the fa ctory, were taken by Mr. L. D. Hares of Pln. Lusignan, and the majority of the rice photographs were the work of the Assistant Chemist of the Department. The necessary arrangements to secure the photographs and the rough planning of the exhibits were carried out by the Government Botanist. The materials were sent to the Institute at the end of the year where they were favourably received by the staff, who are now engaged in setting up the new exhibit in accordance with modern methods of display.

West India Royal Commission.

131. In July a Royal Commission was appointed "to investigate social and economic conditions in Barbados, British Guiana, British Honduras, Jamaica, the Leeward Islands, Trinidad and Tobago, and the Windward Islands, and matters connected therewith, and to make recommendations." This Commission was due to arrive in British Guiana in January, 1939. The Department prepared a comprehensive memorandum on agriculture in the colony.

Plant Inspection Service.

132. During the year 175 import certificates and 41 export certificates were issued. This Service is under the supervision of the Divisions of Entomology and Plant Pathology.

B.—THE RESEARCH BRANCH.

Sugar.

133. The following members formed the Sugar Experiment Stations' Committee for the year:—

The Director of Agriculture	...Chairman.
Mr. J. C. Gibson	Members.
Hon. M. B. G. Austin	
Mr. A. Murison	
Mr. J. Bee	
Mr. R. E. Rhodes	
Mr. G. M. Eccles	

with

Mr. C. L. C. Bourne	...Secretary to the Committee.

134. During the absences from the colony of the substantive members of the Committee,

Mr. H. F. Chapman acted for Mr. G. M. Eccles and
Mr. Jas. Sutherland acted for Mr. James Bee.

135. The following new varieties of cane were imported during the year, from the Central West Indian Quarantine Station at Trinidad;—

B. 3172, B. 3259, B. 34104, B. 34105,
B. 34106, B. 34117, B. 34120, B. 34129,
B. 34130, B. 34134, B. 34137, B. 34163.

136. Of the canes introduced earlier, P. O. J. 2878 has been an outstanding success, Co. 213 has now been well tested and has proved sufficiently satisfactory for its commercial extension to be advised. Some of the other importations have proved to be very valuable in the hybridisation work.

137. The testing work on canes bred prior to 1929 has been completed. It has shown that certain canes of this group could have replaced the old standard cane, D.625, with advantage. None, however, is superior to the new standards, P. O. J. 2878 and Diamond 10 which are now widely planted.

138. Of the promising canes bred between 1929 and 1934, only D.49/30 and D.66/30 have been sufficiently well tested. The former which yields a juice of high quality, may be expected to rival Diamond 10. While it is not generally superior to P.O.J. 2878, D.49/30 is likely to prove useful in certain areas to which it is

adapted and some good stands of it have been seen both on pegasse and frontland. Further extension of D. 66/30 cannot be advised.

139. D. 75/30 has been adequately tested as a plant cane and is probably the best cane in this respect in the colony. More experimental results with ratoons are needed before a definite pronouncement can be made, but in the meantime, estates have been advised to extend their nurseries of this cane. D. 50/30, D. 67/30, and D. 150/30 have shown promise but further experimental data on them are required.

140. Of the canes tested as plant canes and first ratoons only, D. 419/33 and D. 34/33 are the most promising so far, but several others deserve further attention.

141. D. 552/33 and D. 166/34 head the list of varieties tested as plants only. The latter is a *Saccharum* x *Sorghum* hybrid with satisfactory juice and stalk qualities which has grown with exceptional vigour in the nurseries both as plants and ratoons.

142. Some of the 1935 and most of the remaining 1934 seedlings will be put into trials during 1939.

143. The 1936 seedlings have been subjected to their second selection. Of the combinations tried, the following yielded the highest percentages of second selections on,

(a) Clay	and	(b) Pegasse.
P.O.J. 2878 x Co. 213		D.182/30 x Diamond 10
D. 121/33 x D 40/33		D.456/33 x D. 66/30
D. 127/33 x Diamond 10		D.38/30 x Diamond 10
D. 46/33 x Diamond 10		D.127/33 x D.66/30
D. 126/33 x Diamond 10		D.49/30 x Diamond 10
D. 27/33 x Diamond 10		B.6835 x Diamond 10
D. 27/33 x D. 66/30		D.126/33 x Diamond 10
		D.666/18 x D. 66/30

144. The 1937 seedlings have undergone their first selection, a total 2.16 per cent. being selected on clay soil and 0.34 per cent. on pegasse. The 1938 seedlings are being basketed at the time of writing.

145. The fertiliser work during the past year has yielded further confirmation of the soundness of applications of 2 cwt. and 4 cwt. of sulphate of ammonia per acre for plants and first to third ratoons, respectively, on flood-fallowed frontland. Increased evidence is available in support of much heavier dressings of nitrogen (probably of the order of 120-140 lb. Nitrogen per acre for both plants and ratoons) for pegassy clay. If, however, they are given in the form of sulphate of ammonia (5–6 cwt. per acre) a dressing of one ton of limestone per acre at each replanting seems essential on these already very acid soils.

146. In this latter connection, the work has indicated that Nitrochalk is as satisfactory as sulplate of ammonia, at equivalent nitrogen doses, on both frontland and pegasse. Its adoption would correct the increasing soil acidity and obviate the need for applications of limestone. The estates have therefore been advised to give Nitrochalk a thorough commercial trial.

147. The questions of potassic and phosphatic dressings remain obscure and such applications cannot, in general, be advised even where chemical examination reveals a deficiency of these elements in the soil. The problem is apparently complicated by potash and phosphate fixation in our acid soils.

148. Tests of single versus double planting have shown a distinct advantage in favour of the latter.

149. A useful contribution to the subject of field experiment statistics was made during the year by the Statistical Assistant of the Sugar Experiment Station. In it he detailed a method by which appropriate assumed means can be used for individual experiments and the data still combined with a minimum of trouble to obtain a general answer for a wide area.

Rice.

150. One hundred and four varieties were added to the progeny rows during the year. These comprised 93 local selections, 6 Indian and 5 Brazilian varieties.

151. The adaption of the quasi-factorial layout for testing large numbers of varieties has given more precision to the preliminary examination than was possible with simple progeny-row comparisons, and a considerable number of strains was discarded at the end of the autumn crop. The progeny rows will be maintained only for the acclimatization of exotic and the purification of local varieties. For the spring crop, 178 varieties were under observation ; for the autumn crop, 236.

152. From the crosses mentioned in the last report, 232 F_3 selections were planted out at the end of the year. At the same time 21 F_2 plots were planted from crosses made in the spring and 6 F_1 from crosses made in the autumn. It is not proposed to make any further crosses until the large amount of material now on hand has been reduced by selection and test.

153. Twenty-two variety trials were planted during the year in various parts of the colony. Owing to a failure of water supply during flowering at Whim, Corentyne, five trials had to be abandoned at that site and only 17 were harvested. A consideration of the results obtained and those of previous years leads to the following conclusions ;—

1. Judged from the yield standpoint only D.114 is the best of all the varieties available. If certain milling difficulties can be overcome this variety will prove very valuable. It has been compared with Demerara Creole, No. 79 and Blue Stick on many occasions with the following results :—

In 42 trials it outyielded	Demerara Creole	by	404·36	lb.	per	acre.
In 36	„	„	„	No. 79	„	318·80	„	„	„
In 18	„	„	„	Blue Stick	„	288·67	„	„	„

2. No well-tested long-grained variety as yet offers as a substitute for Demerara Creole :—

3. D.99, D.109 and D.110 are heavier yielders than the standard medium-grained varieties, No. 79 and Blue Stick, and are worthy of commercial consideration. In the meantime they are being examined as to drought resistance, a characteristic of No. 79. D. 99 has a longer vegetative period than No. 79.

4. The following varieties should be tested further :—

Long-grained.	Medium-grained.
D.116	D.94
D.253	D.162
D.254	D.246
D.259	D.247
29-37	D.250
Jaisingh	D.255
Nickerie Patna	D.256
	D.257
	Unity

5. The following varieties may be dropped from further trials :—

D. 91	D.251	15-37	Padi Berbice.
D.105	D.258	17-37	Seymour.
D.115	D.261	18-37	Kalyaman.
D.193	D.262	19-37	
D.221	13-37	23-37	

154. In addition to the variety work, investigations are still being carried out in respect to planting practices, involving dates of seeding and transplanting, planting distances, seedlings per hole, manures and fertilisers. In this connection, the phosphate status of padi soils is being investigated and the results obtained therefrom are referred to under the Chemical Section.

155. The work of testing the milling and associated qualities of the varieties under trial was greatly facilitated by the acquisition, in 1937, of a Universale mill obtained from Italy. Varieties of padi have been tested for milling qualities and the results published in the Agricultural Journal of British Guiana (Vol. IX, No. 3, 1938). During the visit of Mr. H. Parker, Manager, Government Rice Mill, Perak, a series of small-scale experiments was carried out in order to test points of importance in the establishment of a central rice mill, to which reference is made earlier in this report.

156. Further particulars of the rice research work will be obtained from the Divisional Reports, published separately, and the Agricultural Journal, in which latter a summary of the results obtained is given. The work of the Rice Grading Branch is referred to under Section I—Rice.

157. Reference has already been made to the district work of the Department in connection with rice and it is pleasing to note that a favourable reaction of cultivators to the advice and assistance given by the District Officers is becoming more and more marked. It is not realised how much detailed work is involved in the laying down of trials and demonstrations, the attention necessary to roguing and maintenance of purity, and the individual contacts necessary with millers and farmers generally in order to ensure that there is no drift backwards in the matter of seed supplies. It is so easy, for example, for cultivators to lose heart and be discouraged by low prices and unfavourable weather conditions both of which have prevailed during the recent years. It is safe to say, however, that in spite of all the difficulties which have been encountered, the colony today is more rice-minded than at any time in the past, and if the work and efforts of the Department both in respect to research and extension have contributed in some way to that result, then the time and trouble expended have not been in vain.

Fish Poisons.

158. Correspondence with Dr. F. Tattersfied of Rothamsted Experimental Station has been of great value in planning future work on fish poison plants. It seems that the low rotenone—and ether extract—contents of the Haiaris, coupled with their high percentage of resins, render it inadvisable at present to extend the experiments which are being conducted with the Lonchocarpus species. A new and very potent Haiari variety from the Rupununi District, called " Ala" by the Indians, was sent to Rothamsted for analysis, but showed only 2.3 per cent. rotenone and 10 per cent. ether extract, and thus there is at present little hope that the indigenous Haiaris could compete commercially with Derris. Further, the Haiaris do not grow well on clay soils whereas cuttings of *Derris elliptica* received from Trinidad and Puerto Rico are showing considerable promise on the heavy clay soil of the Botanic Gardens.

159. It appears, therefore, that the experimental work of the immediate future should be large-scale planting trials with Derris in order to obtain information on its yield and commercial value under the conditions of the coastland soils. Work on this is already under way, but progress will be slow until a large supply of cuttings is available.

I.—Division of Botany and Plant Pathology.

Plant Diseases.

160. No serious diseases of major crops were reported during the year. During the heavy weather in the early part of the year mosaic of tomatoes proved trouble-

some on this crop and bean mosaic also commonly caused damage to Sinebone and other varieties of *Phaseolus vulgaris.*

161. The Cercospora Leaf Spot of bananas on both the Department's experimental plots continued to be serious and the continual rains lasting till August and consequent sodden condition of the ground both weakened the plants, thereby aggravating the disease, and made spraying extremely difficult. Spraying was carried out both with Bordeaux mixture and a new proprietary compound known as Perenox, but the general condition of the plants was so poor that no noticeable benefit was derived from the treatment. By the end of the year over 50 per cent. of the plants at Middlesex were affected by Panama Disease and some 10 per cent. at Supply. In both areas the stumps of diseased plants were treated with Gas Oil.

Foreshore Grasses.

162. Observation have been continued on the foreshore immediately east of Georgetown, where owing to the formation of a caddy beach outside the existing mud flat the latter remains uncovered during the periods between spring tides, resulting in the death of the Courida *(Avicennia nitida)* and Rice Grass (*Spartina brasiliensis*) in the area concerned. The matter is dealt with in a note published in Vol. X, part 2 of the Agricultural Journal.

The Herbarium.

163. The routine work of the Herbarium was continued, and remounting of old sheets is being carried out gradually. A comprehensive collection of the weed flora at the Forest Station, Mazaruni, is being made by an officer of that Department and matched in the Herbarium for naming. A small collection of plants made by a member of the British Guiana Boundary Commission was prepared and despatched to Kew for determination. The usual collection of seed for exchange with allied institutions and private persons was carried out by the Herbarium staff.

164. Further details of the work of this Division are given in the Divisional Annual Reports published separately from which the above has been extracted.

II.—Division of Chemistry.

Sugar Experiment Station Laboratory.

165. During the year, 2,367 cane samples from variety and manurial experiments were analysed for sucrose, juice purity and glucose. These samples were taken from 104 field experiments of which 63 were variety trials and 21 were manurial experiments. These results were analysed statistically by the laboratory staff and are incorporated in *Sugar Bulletin, No. VIII.*

Soil Acidity.

166. A considerable amount of laboratory work on this subject has been carried out during the year, and the results are being prepared for publication. Two points have been studied:—The rate of increase in acidity of clay and pegasse, *i.e.*, the buffering action of the clay as compared with pegasse; and the relative proportions of "active" alumina in clay and pegasse at different degrees of acidity. The amount of "active" alumina in pegasse soils is much higher than that in clay soils, and thus it is possible that aluminium toxicity has played a part in cane cultivation on pegasse soils.

The Phosphate Status of Padi Soils.

167. Analysis of a large number of padi soil samples has shown a complete lack of available phosphate in the topsoil (by Truog's method), while subsoil samples have usually shown appreciable amounts. Experimental plots were accordingly marked off in the Georgetown Rice Station and Pln. Affiance, Essequibo, and graded dressings of superphosphate, from 1 cwt. to 50 cwt. per acre, were applied. The effect of the treatments was a depression in yield, the reason for which is being investigated, and further studies of the fate of the added phosphate will be made.

Rice Parboiling and Milling.

168. During the visit of Mr. H. Parker, Manager, Government Rice Mill, Perak, Malaya, a series of small-grade experiments was carried out in order to test points of importance in the establishment of a central rice mill. The colour of rice for the premium market may be affected by alterations in the methods of parboiling and milling, and this is being investigated. Methods of soaking and steaming have also been examined, particularly by comparison of Malayan methods with those used in British Guiana.

Fish Poison Plants.

169. An unidentified variety of Haiari (*Lonchocarpus sp.*) from the Rupununi District has been sent to Rothamsted for evaluation by Dr. Tattersfield but on the whole it seems unlikely that the Haiaris will become commercially important (see Reports of the Botanical and Chemical Divisions, 1937). The fact that *Derris elliptica* appears to grow well on the coastal clay soil makes it worthy of further investigation, and field trials are being set up when planting material is available.

Tobacco.

170. Field and curing trials with cigarette-leaf types are being carried out by the Plant Breeder, and complementary work is being carried out on the chemical composition of local leaf compared with imported leaves. Through the courtesy of the Demerara Tobacco Co., Ltd. a number of samples of imported leaf were obtained, and these are being compared with leaf from different parts of the Colony in regard to their content of minerals, protein and nicotine. The two local firms, Demerara Tobacco Co. and B. G. Cigarette Factory, are co-operating in the work, and thanks are due to them for valuable assistance during the year.

Citronella Oil.

171. Experimental distillations of citronella grass have been carried out in the North West District, but the quality of oil was found to be low when compared with the standards for Ceylon and Java. Cutting the grass at different stages of growth is now being tried, in order to find the age at which the best oil is obtained under the climatic conditions of that area (see also Report on North West Division).

Soil-less Vegetable Gardening.

172. Great interest has been aroused, particularly in the United States of America, by the recent development of vegetable growing in water-or sand-cultures. An attempt is being made to find a simple inexpensive technique for growing vegetables in sand or water culture, which could be used by gold and diamond workers and would also be of value to householders in towns and villages where soil conditions are almost impossible for gardening.

Soil Erosion.

173. The general position with regard to soil erosion was under consideration early in the year, and a joint statement for the Secretary of State for the Colonies was prepared by the Director of Agriculture, Conservator of Forests and the Director of Public Works and Sea Defences. They conclude that the problem, in its usual aspects, is not important in this Colony, although there is some loss of surface soil in the drainage waters from sugar lands. The lay-out of the sugar estates in this Colony makes it possible to measure, quite accurately, what might be called "normal erosion," and some work on this has been carried out by the Public Works Department in collaboration with this Division.

174. Further details of the work of this Division are given in the Divisional Annual Reports published separately from which the above has been extracted.

III—Division of Entomology.

175. The Entomologist was on leave from May 6 to August 26 on full pay and from August 27 to November 3, on half pay leave which was spent in the United Kingdom. During this time he attended, as the Colony's representative, the International Entomological Conference held in Berlin from August 14 to 21, 1938.

Crop Pests.

176. *Sugar Canes.*—The Amazon Fly maintained its status as a parasite of the black-headed moth-borer, *Diatraea saccharalis.*

177. *Rice.*—There were no serious outbreaks in insect pests of rice during the year. A number of samples were examined for the presence of weevils in connection with the rice grading regulations for export of rice.

178. *Coconuts.*—Another outbreak of the Coconut Caterpillar (*Brassolis sophoræ L.*) occurred in Georgetown commencing in October, 1937, and continued to about September, 1938. A clean-up campaign was instituted and notices were served under the Plant Diseases and Pests Prevention Ordinance.

179. *Other Crops.*—Many enquiries were received for the control of mole crickets and Paris Green bait was recommended and proved efficient in controlling these insects. Enquiries were also received concerning the control of coushi ants and treatment with carbon bisulphide recommended.

Collection and Library.

180. The work of re-arranging the collection continued during the year and satisfactory progress has been made in this direction. As usual, consignments of insects have been sent to the Imperial Institute of Entomology for determination. The Library of the Division has been maintained during the year and book cases of the sectional type constructed to accommodate some of the volumes.

181. Further details of the work of this Division are given in the Divisional Annual Report published separately from which the above has been extracted.

C—LIVESTOCK BRANCH.

Stock Farm.

182. *Cattle.*—The pure-bred Holstein-Friesian herd at the Stock Farm, Georgetown, consists of two cows (in calf) 2 heifers and 3 bulls, while three Guernsey bulls are held for service along with the Holstein-Friesian bulls. There has been a good demand for dairy stock and the Holstein breed has given very satisfactory service in the grading up of local dairy cows, by increased milk yield, quicker growth and hardiness. The services of the Guernsey bulls within the last few years have been in greater demand; the number of cows served was 451. During the year five grade Holstein heifers were sold at auction.

183. During 1937, a free grant of £3,000 ($14,000) was made from the Colonial Development Fund to provide for the improvement of the breed of cattle in the colony. A shipment of pure-bred cattle obtained through the Crown Agents for the Colonies from Messrs. John Thornton, Hobson & Co., arrived early in the year and consisted of four Red Poll Bulls and three heifers, 2 Hereford bulls and 3 heifers. Unfortunately one Red Poll Bull and one Hereford heifer died on the day of arrival.

184. Four more creole cows and heifers were purchased locally for the foundation herd for breeding to Red Poll and Hereford bulls. Three half-bred Red Poll calves (½ Red Poll and ½ creole) were born; they are polled and red in colour and the coat is short like the creole type. The importation of these Hereford and Red Poll cattle has initiated a programme for the improvement of the beef herds of the colony. A small herd of pure-bred animals and a grade herd of each of these breeds will be kept at the Stock Farm for the production of breeding stock.

185. During the year, a small agistment area was started at the Farm for the cows of farmers in out-districts desiring to breed their animals to Red Poll and Hereford Bulls. The area needs enlarging to prove of real value for this purpose although rotational grazing is practised and the animals are moved as soon as the pasture begins to fail.

186. In the absence of any action on the part of large cattle-owners, although repeatedly urged to co-operate in their own interest, Government is almost the sole importer and breeder and this on a scale still too limited for the desired results. The extension to adjoining land and the purchase of a greater number of selected creole cows for grading purposes are two fundamental necessities requiring attention as early as possible if livestock improvement is to make any material progress in the near future.

187. *Pigs.*—The Canadian Berkshire breed continues to give satisfactory results under local condition. The sows gave two litters each during the year, with an average litter size of 8 piglets, and 78 pigs were sold to farmers for improvement of breed.

188. *Poultry.*—Renewed interest was aroused in poultry breeding this year. Three breeding pens of Leghorns and Rhode Island Reds were imported to enlarge the poultry section at the Stock Farm; two pens of Rhode Island Reds and Leghorns were imported from Canada and one pen of Rhode Island Reds from England. Trap nest records have been carefully kept and all low producing birds were culled. During the year 32 birds were sold for breeding purposes and one pen sent to the breeding station at Leguan. The total egg production was 5,519 and this number should easily be doubled during 1939.

Breeding Stations and Agistment Area.

189. A new breeding station was opened at Whim, Corentyne; the Red Poll Bull "Knepp Pundit" obtained from England in 1937 was held for service. The Leguan breeding station continued to have a Guernsey bull and two pens of poultry. The breeding station at Kitty has proved of real service to that area.

190. At La Belle Alliance, Essequibo, an agistment area and breeding centre has been started through funds provided from the Colonial Development Fund. The maintenance of the area, which is approximately 500 acres, is met from Government funds. The whole compound has been cleared of bush, fenced, and the work of erecting bull pens, barn and cottages was completed at the end of December. Three pure-bred bulls of dual purpose type are being stationed there.

191. The distribution of animals on December 31, 1938, was as follows :—

Georgetown Farm.

CATTLE.

Holstein-Friesian.		Red Poll.	
Cows	... 2	Bulls	... 3
Heifers	... 2	Heifers	... 3
Bulls	... 3		
		Hereford.	
Guernsey.		Bulls	... 2
Bulls	... 3	Heifers	... 2
Holstein-creole.		Creoles and cross (Red Poll).	
Bull	... 1	Cows	... 9
		Bull calves	... 3
		Heifer calf	... 1

Pigs.		*Poultry.*	
Canadian Berkshire.		Rhode-Island-Red pens	... 2
Sows	... 6	Barred Rock "	... 3
Boars	... 3	White Leghorns "	... 1
Gilts	... 9		

DONKEYS.

Kentucky Jack	... 1
Working donkeys	... 4
Colt	... 1

Breeding Stations.

Kitty.		*Whim.*	
Holstein bull	... 1	Red Poll bull	... 1

Leguan.

Guernsey bull	... 1
Rhode-Island-Red pens	... 2

Veterinary Work.

192. Two outbreaks of anthrax occurred in different areas on the East Coast, Berbice. The areas were proclaimed and the necessary preventive measures carried out. All contact animals were vaccinated but livestock owners were somewhat tardy in presenting their animals for inoculation and thus hindered effectual control measures. A report was made of tuberculosis infection on sugar estates among a herd of dairy cattle. The tuberculin test was applied and all reactors slaughtered.

193. A report of an outbreak of hemorrhegic septicemia occurred among cattle on the island of Wakenaam and was investigated. Reports of croyza and pneumonia, mastitis and parasitic diseases were also investigated and control measures adopted.

194. Further details of the work of the Livestock and Veterinary Division are given in the report of the Division published separately, from which the above has been extracted.

D —AGRICULTURAL ECONOMICS, STATISTICS AND PUBLICATIONS BRANCH.

195. A start has been made with an economic survey of farming conditions in the rice-growing areas of West Demerara.

196. The system of collecting prices regularly in the Georgetown market in connection with locally grown products has been maintained and this information has been conveyed regularly by telegram to outlying districts. London quotations for the colony's chief agricultural export products are reduced monthly to an f.o.b. Georgetown basis and submitted for Government's information.

Publications.

197. The Agricultural Journal of British Guiana appeared in its ninth volume. Officers of the Research and Field Branches continued to contribute articles to the various numbers. A series of articles on "Malaria in British Guiana" by G. Giglioli, M.D. (It.), M.R.C.P. (Lond.), D.T.M. & H. (Eng.), began to appear in the June issue and has served a useful purpose in helping to make the agricultural and lay community generally, better informed in regard to the chief factors associated with the incidence of the disease.

198. The Farm Journal, in its third year, continued to meet a useful need, being issued for the benefit primarily of the small farmer; the publication provides in simple language information of value and interest to the farm home and is increasing in popularity.

199. Sugar Bulletin No. 7 recording the results of another year's work of the Sugar Experiment Station was published.

200. Papers appearing in non-departmental publications during the year by members of the Department included :—

"The Importance and Use of Appropriate Assumed Means in Collating Field Experimental Results Statistically" by J. B. Bourne in Tropical Agriculture, November 1938.

"An Efficient and Compact Layout for Sugar Cane and Fertiliser Tests by C. H. B. Williams and R. R. Follett-Smith submitted to the International Society of Sugar Cane Technologists, 1938.

"Double versus Single Planting" by C. H. B. Williams and L. A. Forte submitted to the International Societ y of Sugar Cane Technologists, 1938.

"The Determination of Tannins in Cac ao Kernel" by D. W. Duthie in *Analyst*, 1938.

"Observations on the Biochemistry of Cacao Kernel: I. Tannin and Catechin" by D. W. Duthie in *Seventh Annual Report on Cacao Research, Trinidad.*

Library.

201. Additions during the year included 26 new books, 130 periodicals purchased or received in exchange and a large number of bulletin s.

202. There were, in several ways, ma rked improvements in the general library arrangements. The use of loose leaf binders has so cheapened the binding charges that it is now a matter of routine to arrange all agricultural papers received in an easily accessible fashion and to make adequate cross-reference in the index system for subjects to be located with little delay or di fficulty. Practically all of the books and periodicals have now been placed under glass; bo ok cases have been labelled according to a geographical arrangement which helps further to systematise the general lay-out.

E.—CO-OPERATIVE CREDIT BANKS' BRANCH.

203. The Credit Banks, which operate under the provisions of Ordinance No 28 of 1933, continued under the Chairmanship of the District Agricultural Officers, while the Registrar and Auditor is attached to Headquarters staff. The Director of Agriculture is the Chairman of the Co-operative Credit Banks' Board and the Registrar is Secretary.

204. There were on December 31, 1938, 27 banks on the register. Seven of these are still in course of liquidation.

205. At the close of the year the membership of the 20 functioning banks was 8,945; West Indians owned 40,027 shares and East Indians 21,146 out of a total issue of 66,141.

206. The lending capital of the banks is derived from two main sources—share capital subscribed by members and Government loans.

207. The total borrowed from Government is $67,363 and at December 31, 1938, the balance owing was $14,030.12.

208. Loans are made by the Credit Banks to members only and these are chiefly small agriculturalists with valid security, raising crops of padi, sugar-cane, ground-provisions, etc. Some business is also done with persons engaged in coconut oil manufacture, pig-keeping, huckstering, diamond seeking, etc. Money is also lent for repair of buildings and for purchase of properties.

209. In the following table a comparison of the business done in 1937 and 1938 by all banks in the colony is made :—

Year.	Number of Loans.	Amount Lent.	Loans Recovered.	Interest Collected.
1938	1,384	$ 48,931 57	$ 39,298 68	$ 9,404 04
1937	1,018	$ 30,962 34	$ 30,359 24	$ 7,884 15
	366	$ 17,969 23	$ 8,939 44	$ 1,519 89

210. The provision under the rules for Co-operative Credit Banks for building up a Reserve Fund out of profits is fixed at 4 per cent. per annum until it equals one-third and thereafter at 2 per cent. per annum until it equals two-thirds of the paid-up capital of a Bank. The total amount of investments carried by the banks

in this connection at December 31, 1938, was $26,118.43 and, in addition, $952.14 was further allocated by the varinus banks for 1938 to be invested later. There is also a Secretaries' Guarantee Fund in connection with the banks which stood at $4,114.67 at the of 1938.

SECTION III.

ADVISORY BOARD OF AGRICULTURE.

211. The Advisory Board of Agriculture which is constituted by Ordinance No. 26 of 1934 comprised the following :—

Director of Agriculture, Chairman, *ex-officio.*
Deputy Director of Agriculture, Vice-Chairman, *ex-officio.*
Hon. F. J. Seaford, O.B.E., }
„ R. E. Brassington |
„ Peer Bacchus |
„ J. W. Jackson } Members.
Mr. W. H. Richards |
„ R. B. Hunter |
„ S. Andries }

with

Capt. J. F. Irving, M.C., .. Secretary.

212. Three meetings of the Board were held during the year. Among the more important matters dealt with were :—

(1) Proposed approach to the Trinidad Government in connection with the stabilisation of the export trade in plantains.

(2) Cattle Branding Ordinance.

(3) Berbice County Agricultural Exhibition to be held in 1939.

(4) Participation in the Glasgow Exhibition.

(5) Trade Mission to Surinam of the Chairman and the Hon. C. R. Jacob. In this connection the report of the Mission was circulated to the Board for the information of members.

(6) Reduction of freight rates for ground provisions on the East Coast Railway.

(7) Flue-curing of tobacco.

(8) West Indian Fruit and Vegetable Conference, Trinidad, and the motion tabled by the Director recommending that the intercolonial fruit and vegetable trade be carefully investigated by the Governments concerned, both from the commercial as well as the quarantine aspects, with a view to its proper organisation and control.

(9) Losses caused by Panama Disease and Cercospora Leaf Spot at the Banana plots at Middlesex and Supply. In this connection the Board recommended that Government should be informed that further expenditure on the plots was not justified.

(10) Trial shipment of green limes to Canada.

(11) Outbreak of anthrax in Berbice County.

(12) Establishment of the agistment area at La Belle Alliance and livestock activities generally.

(13) Discontinuation of the District Agricultural Committees.

(14) Malva fibre and statements in the "Daily Argosy" connected therewith.

(15) 1939 Estimates, Department of Agriculture.

SECTION IV.

FINANCIAL STATEMENT.

213. The total vote assigned to the Department of Agriculture by the Legislature at its Session for the year was $125,590.00. Table XX gives the balances unexpended and excess expenditure during 1938.

TABLE XX.

BALANCES UNEXPENDED AND EXCESS EXPENDITURE — 1938.

No. of Sub-vote.	Sub-vote.	Balance Unexpended.	Excess Expenditure.
1 (1-16)	Personal Emoluments—Fixed	$ 1,535 18	$ 503 87
(17-25)	do. —Unfixed	858 58	
	Total Personal Emoluments	$ 2,393 76	$ 503 87
	Other Charges:—		
2.	Transport and Travelling	$ 359 00	
3.	Library and Publications	48 88	
4.	Scientific Apparatus and Equipment	...	$ 238 57
5.	Botanic Gardens	1 11	
6.	Government Gardens and Grounds	1 64	
7.	Purchase, Production and Distribution of Seeds and Plants	41 82	
8.	Experiment Stations	...	343 68
9.	Apiary	57	
10.	Livestock	22 50	
11.	Grants-in-aid of Agricultural Associations, Exhibitions and Competitions ...	567 46	
12.	Rice Grading Expenses	148 94	
13.	Training of Apprentices	1 28	
14.	Veterinary Preventive Measures	...	465 89
15.	Plant Pests Preventive Measures...	112 74	
16.	Soil Surveys	62 63	
17.	School Gardens	328 76	
18.	Experiments with Plants of Insecticidal Value	1 93	
19.	Experimental Farm Settlements...	27 69	
20.	Maintenance of breeding centre and agistment area at La Belle Alliance ...	413 66	
21.	Experimental Banana Cultivation	104 40	
22.	Miscellaneous	22 22	
	Total Other Charges	$ 2,267 23	$ 1,048 14
	Extraordinary Expenditure:—		
23.	Motor Boat Engine	$ ...	...
24.	Re-conditioning by-roads in Botanic Gardens	2 89	
25.	Agricultural Economic Survey	984 36	
26.	Office Rent	..	$ 100 00
27.	T. Bell's Passage to British Guiana from England	...	195 36
		$ 987 25	$ 295 36

214. The payments in the Treasury for the year were as follows :—

Agricultural Stations ...	...$	1,874 95
Botanic Gardens ...	...	547 80
Veterinary Division ...	...	1,165 60
Sale of Official Publications	...	91 15
Rice Grading Samples, etc.*	...	16 00
Sundry Reimbursements	...	3,240 00
Miscellaneous ...	...	85 12
Auction duty on sale of camera	...	1 50
	$	7,022 12

SECTION V.

SUMMARY OF AGRICULTURAL LEGISLATION ENACTED DURING 1938.

215. The following agricultural legislation was enacted during the year :—

1. Ordinance No. 13 of 1938 to amend the Co-operative Credit Banks Ordinance, 1933, in certain particulars.
2. Order in Council under section 4 of the St. Vincent Plant Protection Ordinance, 1935. This order permits the importation into St. Vincent of raw coffee from British Guiana.

* Rice Grading Fees are collected by the Customs Department, and amounted to $2,543.25 in 1938.

3. Importation of Plants, Provisions, etc., into Trinidad—Department of Agriculture notice drawing attention to new legislation recently introduced into Trinidad affecting the importation of plants, etc.

4. Order in Council under Section 3 of the Plant Diseases and Pests (Prevention) Ordinance, 1935. This order deals with the importation of certain citrus fruits from the British West Indies.

5. List of Registered Veterinary Surgeons—Department of Agricultural notice in accordance with Sections 3 (1) and (3) of the Animals Diseases Ordinance, 1936, publishing list of Registered Veterinary Surgeons.

6. Order in Council under Section 15 of the Animals Diseases Ordinance, 1936. This order prohibits the movements of all animals in or out of Plantations Sea Well and Palmyra, Berbice, these areas being infected with Anthrax.

7. Order in Council under Section 3 of the Plant Diseases and Pests (Prevention) Ordinance, 1935. This order prohibits the Importion of Rice Seed (Padi) without the written authorisation of the Director of Agriculture.

8. Order in Council under subsection (3) of Section 4 of the Sugar Quota Ordinance, 1937. This order allocated the quota for the year 1st September, 1938 to 31st August, 1939.

J. SYDNEY DASH,
Director of Agriculture.

June 15, 1939.

SUGAR EXPERIMENT STATIONS' COMMITTEE.

Director of Agriculture, Chairman, *ex officio*		
Hon. M. B. G. Austin, O.B.E.	...Georgetown	Representing the Sugar Industry which maintains the Stations.
Mr. G. M. Eccles ...	...Pln. Blairmont	
,, J. C. Gibson ...	... ,, Port Mourant	
,, A. Murison ...	... ,, Pln. Uitvlugt	
,, R. E. Rhodes ...	... ,, Diamond	
,, J. Bee ...	... ,, Albion	

CO-OPERATIVE CREDIT BANKS' BOARD.

Director of Agriculture, Chairman, *ex-officio*		
Dr. the Hon. J. B. Singh ...	...	Members.
Rev. A. E. Dyett ...	...	
Mr. C. Farnum ...	...	
Mr. J. L. Wills ...	...	